'The Extent of These Materials is Simply Enormous': The Creation and Publication of *The Medical & Surgical History of the War of the Rebellion* from 1862 to 1888

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ABSTRACT: As a major component of its creation in 1862, the Army Medical Museum (now the National Museum of Health and Medicine), was to produce *The Medical and Surgical History of the War of the Rebellion*. This project was planned to discuss every aspect of military medicine encountered during the American Civil War. Using records such as correspondence, reports, memorandum and drafts of the project, this paper discusses the writing and producing of the six volumes, as well as their reception. An encyclopedic medical treatise based on case histories, the History is a systematic, statistical compilation of the types of injuries and diseases a military surgeon could expect to treat, along with

discussions of and examples of treatments. Army surgeons John H. Brinton, George Otis and J.J. Woodward directed the project and amassed thousands of specimens and accounts from surgeons and doctors, including Confederates, while records of the Pension Office were heavily utilized to follow up cases. Museum specimens were photographed, and engravings, lithographs and photomechanical prints were made to illustrate the text. The giant undertaking was a triumph of medical research which eventually took twenty-three years and more than 6,000 pages to complete by 1888. While this was an undertaking that could only be completed by a National institution, much of the groundwork was laid outside of Washington. As a center of both medical education and publication, Philadelphia linked many of the creators of the volumes including US Army Surgeon General William Hammond, his successor Joseph K. Barnes, Brinton, Woodward, pathologist Daniel S. Lamb, medical illustrators Edward Stauch and Hermann Faber, and noted photographer William Bell.

KEYWORDS: Civil War, surgery, George Otis, J.J. Woodward, Army Medical Museum, military medicine, pathology, US Army.

Only a few weeks after taking over the U.S. Army Medical Department in May of 1862 as a reformist political appointee, Surgeon General William Hammond (fig. 1) established the Army Medical Museum, the first federal medical research facility. Hammond, although serving in the Army in the West, had joined the Philadelphia Biological Society while on sick leave. His membership in this close-knit scientific group seems to have influenced his conception of a museum and medical history of the war.[1] Government-funded medical research, which is now seen as a commonplace role, began with Hammond's

1. Bonnie Ellen Bluestein. "The Philadelphia Biological Society, 1857-61: A Failed Experiment?" *Journal of the History of Medicine and Allied Sciences* April 1980, pp. 188-202. More information on Hammond can be found in Evelyn S. Drayton, "William Alexander Hammond 1828-1900: Founder of the Army Medical Museum," Military Surgeon, *109*, 4, October 1951, pp. 559-565 and Bonnie Ellen Bluestein, *Preserve your Love for Science: Life of William A. Hammond, American Neurologist* (Cambridge University Press, 2002).

creation of the Museum. The records collected by the Museum during the war, and indeed the entire idea of the Museum, were to produce the *Medical and Surgical History of the War of the Rebellion.*[2] This was not the first time that a medical history of a war had been written; the British had produced a book on their medical experiences in the Crimea, and a similar account by the French was in preparation when America's war began[3]. However, the American Civil War was of a different order of magnitude and so was its *History*. The six-volume set attempted to discuss every aspect of military medicine encountered during the Civil War (fig. 2). The massive Northern bureaucracy and organization was replicated on a smaller scale in the Surgeon General's Office. Hammond, brought in to replace the superannuated Surgeon General Clement Finley and to shake up the hidebound Department,[4] created his own, far larger, bureaucracy with its own policies, forms and regulations. Reports were revised time and again to ensure the clear flow of knowledge back to Washington. The *History* could only be done by a large, and soon to be permanent, bureaucracy. The Museum would need to make extensive use of Philadelphia's medical establishment to complete the volumes.

A product of the nineteenth century's philosophy of natural history, the *Medical and Surgical History of the War of the Rebellion* is an encyclopedic treatise based on case histories resulting in a systematic, statistical compilation of the types of injuries and diseases a military surgeon or doctor could expect to treat, along with discussions and examples of treatments. It was not a textbook, but rather a reference book, a compendium of experience (fig. 3). A triumph of medical research, this giant undertaking finally weighed fifty-six pounds and took twenty-three years and over 6,000 pages to complete. By the time it was done, both editions of the six volumes - three each of Surgical and Medical

2. Hereafter referred to in the text as the *History*. Cited in notes as *MSHWR*, Medical or Surgical volume number.

3. United States Army Surgeon General's Office. *Circular No. 6: Reports on the Extent and Nature of the Materials available for the preparation of a Medical and Surgical History of the Rebellion* (Philadelphia: Lippincott, 1865), p. 2.

4. For more information, see Mary C. Gillett, *The Army Medical Department 1818-1865* (Washington, DC: United States Army Center of Military History, 1987).

concerns - apparently cost well over $100,000.[5] The illustration plates for the second editions of the second and third Medical volumes alone cost $29,510. Since the *History* itself was a distillation of millions of pages of medical information, this article reviews its creation and a few points of interest, rather than the contents of each volume.

The project was assigned by Surgeon General William Hammond to Museum curators John Hill Brinton (fig. 4) and Dr. Joseph Janvier Woodward. Brinton had the responsibility to compile the Surgical (i.e. injuries) section and Woodward the Medical (i.e. diseases) section. When Brinton left the Museum, George Otis (fig. 5) took over the Surgical section. Both Otis and Woodward had been recommended for their assignments by Assistant Surgeon General Charles Crane.[6] Surgeon General Joseph K. Barnes, who succeeded Hammond, and Crane's support for the project never flagged as the years went by. Accounts were solicited from surgeons and doctors, including Confederates, and the records of the Pension Office were heavily utilized to follow up cases. Museum specimens (fig. 6) were photographed; engravings, lithographs and photomechanical prints were made to illustrate the text. Books, photographs, specimens, equipment - all were purchased although not at the rate the authors would have preferred.

Brinton was well-suited to the task of creating both the Museum and the *History.* Born and raised in Philadelphia, he was thirty years old when assigned to create the Museum. He had received his medical degree from Philadelphia's Jefferson Medical College in 1852 and a master's degree from the University of Pennsylvania a year later. After a year of study in Paris and Vienna, the centers of medical education at that time, he returned to practice in Philadelphia. He taught surgery at Jefferson Medical College until the outbreak of the war. Enlisting as a volunteer surgeon, Brinton served in the West with Grant and

5. Woodward to Assistant Surgeon General Charles Crane, 29 July 1875*,* OHA 28: Curatorial Records: Woodward Letterbooks, 1864-1883, Otis Historical Archives, National Museum of Health and Medicine, Armed Forces Institute of Pathology, Washington DC. Hereafter cited as OHA 28 and all OHA citations are from the Archives of the Museum.

6. John C. Hemmeter, "Joseph Janvier Woodward, Brevet Lieutenant Colonel, U.S. Army, Pioneer in Photomicography, Pathologic Histology and Medical Historian of the Civil War," *Military Surgeon,* 1923, *52*, 635-647, p. 647.

Sheridan before transferring to Washington to work on the Museum.[7]

Brinton's colleague, J.J. Woodward (fig. 7), had been assigned to the Surgeon General's Office on 19 May 1862.[8] Woodward was also from Philadelphia, where he was born on 30 October 1833. He received his medical degree from the University of Pennsylvania in 1853 and, like Brinton, a master's degree afterwards. He began practicing medicine in Philadelphia and, until the outbreak of the war, conducted research and published several papers on cancer.

Other Philadelphians besides Brinton and Woodward helped establish the Museum. Frederick Schafhirt, a German-trained anatomist, was hired in 1862 to prepare bones for the collection. He had worked for Joseph Leidy at the University of Pennsylvania and "was adept in preparing and mounting specimens for a museum."[9] At various times, Schafhirt's two sons, Adolph and Ernst, assisted him.[10] He remained with the Museum until his death in 1880. Daniel S. Lamb (fig. 9), who was with the Museum for sixty-five years, joined the staff as a hospital steward on 3 November 1865. Lamb, another native of Philadelphia, was born in 1843 and enlisted in the Army at age eighteen and spent the war serving in military hospitals. After joining the Museum, he earned his medical degree from Georgetown University. Lamb became the staff pathologist and essentially ran the Museum from 1883 until the entry of America into World War I in 1917. In 1863, Philadelphian J.K. Barnes (fig. 10) succeeded Hammond as Surgeon General and supported the project for over a decade.

On 9 June 1862, the *History* was publicly announced to the Medical Department. Hammond's *Circular No. 5* (fig. 11) assigned the writing of the *History* to Woodward and Brinton and

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7. John S. Haller, Jr., “Preface” in John Hill Brinton, *Personal Memoirs of John H. Brinton, Civil War Surgeon, 1861-1865*, (Carbondale: Southern Illinois University Press, 1996), pp. xv-xxiv.

8. Daniel S. Lamb, *A History of the United States Army Medical Museum 1862 to 1917 Compiled from the Official Records*, unpublished manuscript, Otis Historical Archives, National Museum of Health and Medicine, p. 2.

9. John Hill Brinton. *Personal Memoirs of John H. Brinton, Civil War Surgeon, 1861-1865*, (Carbondale: Southern Illinois University Press, 1996), p. 182.

10. Henry, Robert S. *The Armed Forces Institute of Pathology: Its First Century 1862-1962*, Washington: Office of the Surgeon General, 1964, p. 22.

requested many types of information from medical officers. To promote compliance, the announcement promised to put the contributor's name in print for the ages. Charged with writing the *History*, while also creating the Medical Museum, each had their own ideas on how to proceed. They both began collecting specimens (fig. 8) from surgeons in the field.[11] Woodward began looking at statistics, publishing *Circular No. 15: Sickness and Mortality of the Army during the first year of the War*, an eight-page survey, on 8 September 1863. Brinton soon published his statistical survey, *Circular No. 9: Consolidated Statement of Gunshot Wounds* and then proceeded to ignore the cold, dry numbers and solicited descriptive battlefield reports.[12]

In keeping with his plan to track surgery in the war through each battle, Brinton needed maps of the battlefields. "A great desideratum is a map of the locality with the position of the hospital correctly laid down. This I could have engraved and inserted in the Book," he wrote to Surgeon John Craven who had reported on skirmishes on Morris Island, South Carolina.[13] The maps were published, along with the field reports solicited by Brinton, in the appendix of the first Medical volume. They were credited to Woodward and Otis; Brinton's name was not mentioned although Otis credited him in the opening paragraph of the first Surgical volume. In later years, Brinton felt that he did not get enough credit for his initial work on the surgical portion. In his autobiography, he wrote, 'My name does not appear in any of this work, but it was designed by me, and much of it executed under my direct superintendence. Some was done by my successor after my departure from Washington."[14]

Both Brinton and Woodward encountered difficulties in gathering information to research disease

11. See John Hill Brinton and William Moss, *Catalogue of the Army Medical Museum*, (Washington: Government Printing Office, 1863) for information on the earliest collections of the Museum. This was soon superseded by a larger three-volume set: Alfred A. Woodhull, *Catalogue of the Surgical Section of the United States Army Medical Museum* (Washington: Government Printing Office, 1866); J.J. Woodward, *Catalogue of the Medical Section of the United States Army Medical Museum* (Washington: Government Printing Office, 1867); Edward Curtis, *Catalogue of the Microscopical Section of the United States Army Medical Museum* (Washington: Government Printing Office, 1867).
12. *MSHWR*, Surgical I, p. xiii.
13. Brinton to Craven, 22 August 1863, OHA 15: Curatorial Records: Letterbooks of the Curators, 1863-1910.
14. Brinton, *Personal Memoirs*, p. 206.

and injury. Brinton found reports coming into the Museum listed gunshot wounds without accompanying information such as part of the body wounded or results of surgery. Another problem was patients being counted as new cases each time they were transferred from hospital to hospital.[15] Brinton was forced to state, "The inadequacy of the entries in the ...monthly report of sick and wounded was early acknowledged, and it was officially declared that previous to September, 1862, 'the surgical statistics of the war were absolutely worthless,' and that 'the only information procurable is such as can be derived from the examination of a mass of reports, all of which present merely certain figures under the vague and unsatisfactory heading, *Vulnus sclopeticum* [gunshot wound].'"[16] New forms, reports and registers were designed in late 1863 by a special board of medical officers. A small register was given to officers to use in the field. Two larger ones, one for information on the sick and wounded and one for surgical operations, were used in hospitals with new quarterly report forms. The new information, as well as specimens, arrived in the Museum to be processed by doctors and clerks for use in the *History*.[17] Woodward, like Brinton, had problems gathering information. Soon after he was placed in charge of the Division of Medical Records, Woodward realized that the then-current forms with spaces for 143 diseases worked fine during peace but were inadequate in war.

Along with Brinton, both Otis and Woodward brought an immense learning to the project, surveying all that was known on a subject before drawing any conclusions. Woodward wrote, "In view of the many errors of fact scattered through the text-books, some of which have been repeated for ages by authors copying from each other, I early resolved that, so far as possible, I would cite no authority not before me when I wrote; and that, for the convenience of subsequent students, I would in every case give not only the name of the author but the edition and page to which each citation referred."[18] They traced diseases through history. Woodward once asked Otis, "Will you do me the very great favor to request one

15. Ibid, pp. 249-50.
16. Brinton, *Consolidated Statements of Gunshot Wounds*, quoted in *MSHWR*, Surgical I, p. xxv.
17. *Circular 6,* p. 3-6.

of the distinguished French Physicians with whom you have the honor to correspond, to obtain for me at the Bibliotheque Nationale of Paris a textual copy of that part of the Greek Manuscript of Ætius which corresponds with the heading and first sentence of ... the Latin translation of J. Cornarius, Basel Ed. of 1532..." Woodward wished to ensure the two translations he had were both from the original Greek document on diarrhea.[19] The books collected to fulfill this need to review directly all known information on a subject formed the foundation, under John Shaw Billings's direction, of the National Library of Medicine.

Circular 6

When Otis succeeded Brinton as curator of the Medical Museum, he also became responsible for the Surgical section of the *History*. Before the close of the war, Otis realized that Brinton's plan to write a surgical history of each battle would not work due to the sheer amount of information being received. "During that year [1864] there were no less than two thousand skirmishes, actions, or battles, and to have given a correct analysis of the casualties from the returns from the field and base hospitals would have been impossible."[20] Instead, Otis decided to arrange the Surgical volumes by type of wound and region of the body. The battlefield reports that Brinton had already collected would be an appendix to the first Medical book. He promoted his new plan in the Museum's first major post-war publication, *Circular No. 6: Reports on the Extent and Nature of the Materials available for the preparation of a Medical and Surgical History of the Rebellion.*[21]

Otis and Woodward published *Circular No. 6* (fig. 12), heavily illustrated with woodcuts and lithographs, on 1 November 1865. The *Circular* became the blueprint for the *History*. In keeping with the planned format of the *History*, Otis wrote the Surgical report while Woodward produced the Medical one. The book, which it certainly is at 166 pages, purports to be a report (fig. 13) to Surgeon General Barnes

18. *MSHWR,* Medical II, p. iv.
19. Woodward to Otis, 27 December 1875, OHA 28.
20. *MSHWR*, Surgical I, p. xiii.

from Otis, "in response to your inquiries relative to the nature, extent, and value of the surgical data that have accumulated in the department of your office under my charge."[22] Barnes knew very well what Otis and Woodward were doing, especially in light of the considerable financial costs of the project. *Circular 6* was even published by the noted medical printer J.B. Lippincott of Philadelphia. The first edition of 5,000 copies cost well over $6,000. When Lippincott raised the issue of selling copies of the book, Otis replied that it would continue to be distributed at no charge by the Surgeon General.[23] *Circular 6* was aimed at the medical officers of the Army to encourage their continued enthusiasm for, and participation in, the projected *History*. Much of the expense of such free publications was made possible by the transfer to the Museum of slush funds from the closing hospitals.[24]

Both Woodward and Otis wrote extensive introductions on their materials and methods before presenting specific examples of information available for the *History*. "The extent of these materials is simply enormous," Otis noted. By comparison with the British and French experience in the Crimea, where the combined armies had suffered 653 gunshot fractures of the femur, over 5,000 such cases were reported to Otis.[25] Otis recognized and explained the value of this material, saying, “It may be emphatically said that they throw much light on some of the great moot points in surgery; that they comprise on some subjects, as, for example, on the question of the propriety of excising the head of the femur for injury, fuller data than are now extant in the entire range of surgical literature; and that it may be hoped, without temerity, that they include the elements for the solution of many grave surgical problems.”[26] Otis laid out *Circular 6* the way he anticipated organizing the *History*. He covered wounds of the body, starting with the head and working down, examining surgical treatments such as excision and amputation for each section. A brief overview of the medical department staff was followed by a review

21. Hereafter cited in text and notes as *Circular 6*.
22. *Circular 6*, p.1.
23. Otis to Lippincott & Co, 24 February 1866, OHA 15.
24. Lamb, *History*, p. 37.
25. *Circular 6*, p.2.

of the medical resources, including transportation, available to the surgeons. Two-color lithographs by Philadelphian Thomas Sinclair illustrated the Surgical section (fig. 14). Otis optimistically ended his report by concluding that two large books would be adequate to the topic.[27] In fact, his estimates were not accurate, and Otis's initial plan for the Surgical history was much altered when it began appearing. An additional 600-page volume proved necessary to cover the topic adequately.

Woodward followed much the same pattern as Otis's. He listed the available material that he would be using, including medical statistics and pathological studies.[28] Woodward's primary interest for his first volume lay in statistics. He defended his data against criticism of two types. Diagnostic errors would be eliminated by combining similar diseases that might have been confused by doctors. Diseases of the eye would all be put together under "ophthalmia" to highlight the most important fact -- disease of the eye occurred at a certain rate in the Army. Errors of negligence were a bit more difficult for Woodward to address. Woodward answered these critics, saying the reports during the war to the Surgeon General "contain internal evidence of the care with which they were prepared, and, it is believed, will compare favorably with any other set of statistical papers in existence."[29] It was true that some reports were never made, were lost or were badly done, but in light of the sheer mass of information, in Woodward's view, they became statistically insignificant. Woodward's statistical work led him to conclude that fewer troops died from disease in the Union Army than during any previous war, but that the mortality rate for soldiers due to disease was more than five times higher than expected for a similar group of men during peacetime. The rate of deaths due to disease was also far higher than that from injuries. Facts like these enabled Woodward to state unequivocally the value of the *History*, “Such a publication, therefore, becomes one of the most important duties of the Medical Department of the army; a duty the evasion or neglect of which would be a grave crime against the army of the United States, and against every

26. Ibid., p. 3.
27. Ibid., p. 88.
28. Ibid., p. 89.

American citizen who, in future wars, volunteers in the defence (sic) of his country."[30]

Woodward, like Otis, organized the *Circular* as he would the *History*. He discussed the mortality rate of the Army and statistically examined the disease rate. He previewed the Medical and Microscopical sections, the two Museum sections under his care, relating details of individual cases. A full color lithograph by Philadelphian F. Moras after artwork by Hermann Faber was included; plates by this team would be published in the third Medical volume twenty-three years later. Woodward closed with a discussion of the design of hospitals during the war (fig. 15). He included lithographs that were later not reproduced in the *History* such as a "Birds Eye View of Lincoln General Hospital." He correctly estimated that three volumes would be necessary.[31]

Circular 6 proved to be extremely popular; on 9 February 1866, four months after it was printed, Otis requested a bid from Lippincott for a second edition of 2,500 copies. No substantial changes were to be made. "With the exception of the correction of typographical errors, the second edition must be in every respect uniform with the first," were his instructions.[32] Otis negotiated with Lippincott over the price of the second edition; he was willing to pay $1.28 per copy for a total cost of $3200, not $3475 as Lippincott had requested.[33] *Circular 6* was the last volume that Lippincott, who had printed forms and books for the Museum through the war, would handle; in the future, Museum publications were usually done by the Government Printing Office in Washington, instead of Philadelphia.

Technical production

Photography (fig. 16), more than any other form of illustration, made the Museum's publications possible.[34] Less than two hundred pieces of artwork were made for the History, while thousands of

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29. Ibid, p. 92.
30. Ibid, p. 90.
31. Ibid., p. 166.
32. Otis to Lippincott, 9 February 1866, OHA 15.
33. Otis to Lippincott, 15 February 1866, OHA 15.
33. For an extensive discussion and reproductions of photographs by the Museum, see JTH Connor and M Rhode. "Shooting Soldiers: Civil War Medical Images, Memory, and Identity in America," *Invisible Culture 5: Visual*

photographs were used. Photographs were not directly reproduced though; halftone illustrations were not invented until 1880 and did not become common until after 1890. [35] The photographs of specimens and soldiers still had to be interpreted by the engraver or lithographer (fig. 20). Color was only possible when an artist's work was reproduced via lithography, and the nature of some of the medical illustration required it. Philadelphians made many of these specialized illustrations for the *History*. Like the curators, much of the staff working on the History where Philadelphians. One of the Museum's major artists was Philadelphian Edward Stauch. Brinton thought highly of Stauch's work, but unfortunately, Stauch did not survive the war. He died on a trip home to Philadelphia after successfully sketching wounds at the siege of Petersburg, Virginia. Brinton, who had gone to Philadelphia to find Stauch, thought his illness "probably of some nervous type, the result of exposure or of mental disturbance."[36] Stauch's death left a hole in the Museum's ability to produce medical illustrations, a hole both Brinton and Otis deplored. Otis, crediting Stauch's work years after his death, wrote, "The gifted artist, Mr. STAUCH, whose services Surgeon Brinton had fortunately secured, after preparing many water-color drawings of recent injuries, at the field hospitals, died from pernicious fever contracted before Petersburg, without completing the exquisite studies of embolism, cranial abscess, false aneurism, osteomyelitis, and gangrene (fig. 21), which he had drawn from dissections made at the Museum."[37] Hermann Faber (fig. 18) was the Museum's other main artist. Faber, a trained artist who emigrated to America from Germany, has been described with his sons as "the founders of medical illustration as a profession in this country." He did many illustrations for the Museum, mostly for Woodward's *Medical History*. After the war, he moved to Philadelphia and continued his career as a medical illustrator along with two of his sons.[38]

Culture and National Identity, Winter 2003, http://www.rochester.edu/in_visible_culture/Issue_5/ConnorRhode/ConnorRhode.html

35. William Welling, *Photography in America: The Formative Years 1839-1900* (Albequerque: University of New Mexico Press, 1987), p. 263-4.
36. Brinton, *Memoirs*, p. 287-8.
37. *MSHWR*, Surgical I, p. xxviii.
38. "Ars Medica," *Medical Affairs University of Pennsylvania*, October 1968, pp 2-10.

Otis seems to have assigned more value to the position of 'photographic artist' than Brinton did. Most of the Army Medical Museum's early photographic work was done by Philadelphian William Bell (fig. 21) in the Museum's studios. Bell joined the Museum staff, reenlisting in the Army as a hospital steward, on 22 February 1865.[39] A professional photographer in civilian life, Bell replaced Wills as the main photographer in the Museum while Wills stayed as his assistant.[40] Bell might have been recommended to Otis by Constant Guillioû, the president of the Philadelphia Photographic Society.[41] Otis had written to Guillioû, requesting advice on the purchase of camera equipment as Otis felt much of the equipment he purchased was defective.[42] Otis undoubtedly needed Bell; two weeks earlier, Otis had had to turn to L. W. Walker, the Treasury Department photographer, to test a camera that he had ordered for $182.00.[43] Bell had served in the Mexican War with the 6th Louisiana Regiment, U.S. Volunteers. After the war, he moved to Philadelphia and worked as a daguerreotypist. In 1862, he again enlisted in the Army, this time in the 1st Pennsylvania Volunteers, fighting at Antietam and Gettysburg.

In addition to photographing specimens and wounded veterans who visited the Museum, Bell did other photographic work, little of which has been credited to him. Bell, and later Ward, took dozens of portraits of notable Washington personalities and visitors. Bell photographed General Seth Williams at the Medical Museum. Otis recalled, "The picture was taken at the Army Medical Museum (fig. 35), and a few prints were prepared, after which the negative was sent to Brady, from whom a number of General Williams' friends have procured copies of the photograph. The negative is still in the keeping of Mr. M.P. Brady, (Brady & Co) 352 Penna Avenue, Washington, D.C."[44] The negative, taken with a carte de visite

39. Although Brinton says in his autobiography, "In the latter part of the summer [or 1864], a photographic bureau was added to the Museum, and I had to see to engaging the proper artists and outfit. I succeeded after much trouble in procuring an excellent artist, named Bell..." Brinton, *Personal Memoirs*, p. 284.
40. Lamb, *History,* pp. 33, 35.
41. Unfortunately letters arriving in the Museum have been missing since at least 1917. Lamb labored under the same difficulty in producing his *History*. Lamb, *History*, p. 144.
42. Otis to Guillion, 13 December 1864, OHA 15.
43. Otis to Holmes, Booth and Haydens, 9 February 1865, OHA 15.
44. Otis to George E. Hastings, 15 June 1866, OHA 15.

camera, actually had four images of Williams on the plate. Broken in half, one section remains in the Medical Museum while the other is in the National Archives credited to Brady. When his second term of enlistment lapsed on February 22, 1868, Bell returned to Philadelphia and opened the Bell & Silver photographic studio. He continued working for the Museum (fig. 22), writing to Otis on 28 May 1868, soon after leaving the Museum, "I express today to the Army Medical Museum, Negatives and Prints of 'Durkins' Case... the Quality of the Negatives and Prints will I feel assured equal any done while under your Orders in Washington."[45] In an undated letter to Otis, Bell said, "While there [at the Philadelphia Pennsylvania Hospital] endeavored to see if there was anything that would be of value to the Museum but saw nothing..."[46]

Engravings were made from small-format photographs of the carte de visite size (roughly slightly thinner than a modern baseball card), taken of museum bone specimens to illustrate the *History*, the *Catalogue* and other publications of the Museum. The photographs usually showed a bone, damaged by a gunshot or cannon and with the flesh removed, mounted on a piece of wood which had a museum identification number painted on it. This was by far the most common way the Museum published its photographs. When *Circular 6* was published soon after the war, the Museum had two staff engravers, probably hospital stewards and the specimens in the Museum were already being photographed for the engravers.[47] The Museum could not achieve the technique of directly printing a photograph on wood, which would then be engraved by carving out the lines of the picture, for its early publications such as *Circular 6*. In June, 1866, Otis wrote to William Washburne of Lippincott & Co. requesting advice. He wrote, “Can you do me the favor to enquire of the wood engravers in Philadelphia what process they find most available for securing photographic impressions on wood blocks… I don't expect to get better pictures by photographing on wood directly; but the profession will perhaps be better satisfied of the

45. The picture was published as Surgical Photograph #194. Otis's text for the photograph claims that Durkins visited the Museum to have his picture taken. This seems unlikely in light of the ornate mirror and rug in the picture.
46. Bell to Otis, OHA 26: Curatorial Records: Special Correspondence, 1862-1887, Box 2 - Photography.

exact fidelity of the illustrations, if this plan is adopted."[48] Even in 1874, few photographs were printed directly on wood in the Museum; most were still being drawn by the illustrators for the engraver. In April 1874, only five photographs were made on wood by Ward to be engraved, while forty-one drawings and fifty engravings were done.[49]

Henry H. Nichols was hired as a wood-engraver for $100 a month soon after the end of the war. He had been working in the Museum as a private in the Veteran Reserve Corps until he was discharged. The following year Nichols seems to have recommended Ephraim M. Wells to Otis. Otis sent him two photographs to copy in pencil on Bristol Board to test his work. Wells, "a draughtsman of unusual merit, now employed in the New York Central Railroad Car Shops," was hired as a "draughtsman for wood engraving" for $125 per month, "to be paid from the funds appropriated at the last session of Congress for the preparation of a medical and surgical history of the war."[50] Nichols's and Wells's work was considered technically excellent (fig. 23). Otis had tried contracting some of the work to Lippincott and Co., but, "The critics here do not esteem the work equal to that done by our own engravers. It is fine and delicate, but does not represent the texture of the unbroken and fractured or necrosed surfaces of bone as accurately as is done by the engraver (sic) who work steadily on this particular branch. Such at least is the verdict of the artists and officers here, who are perhaps not impartial judges. I think in future I shall have the mechanical drawing done in Phila[delphia], and the pathological illustrations illustrated here."[51] After Wells completed the image's transfer and Nichols finished his engraving, the wood block was sent to Philadelphia or New York to be electrotyped. The wood block engraving was pressed in wax and then copper or nickel was electrolyzed to cover the wax and produce the electrotype printing plate. The electrotype block, which could be set in with the type for the book to be printed, was easier and cheaper to

47. *Circular 6*, p. 7.
48. Otis to Washburn, 19 June 1866, OHA 15.
49. Parker to Otis, 30 April 1874, OHA 15.
49. Otis to Barnes, 21 July 1865; Otis to Nichols 31 July 1865, Otis to Wells, 21 November 1866, Otis To Barnes, 24 December 1866, OHA 15.

use than lithographs or photomechanical prints, which had to be individually printed and then bound into the typeset pages. Woodward's delicate pictures of microscopic views could not be wood-engraved electrotypes. A. E. Lent of Philadelphia engraved them directly on steel (fig. 24).[52]

Lithography was the Museum's initial choice for reproducing artwork and photographs in publications. Many lithographers were used by the Museum. John Cassin of Bowen & Co. in Philadelphia did two-color chromolithographs for *Circular 6* at a rate of no more than $150 per 1000 prints.[53] Thomas Sinclair of Philadelphia did the lithographs for the circular. Sinclair & Son and Julius Bien of New York city did most of the chromolithograph plates for the Surgical volumes.[54] Otis was an exacting taskmaster, frequently requiring modifications in the chromolithographs. He wished them to be exact in a medical sense with correct coloration of tissue and injuries, but he had aesthetic requirements as well (fig. 17). A lithographer was told, "I find the flesh tints too highly colored, the face especially too florid. The man had been confined to a hospital for more than a year and was probably pale and less fleshy than would be inferred from your representation of his remaining leg. The gray of the cap and jacket has too much blue in it. You must give the regular pepper and salt dirty Confederate gray. In the stump you should follow the drawing (fig. 25) sent you quite closely. Do not omit the eight dots which represent the scars of the punctures through which the stitches passed."[55]

However Otis was willing to countenance extensive modifications of an original photograph to get a good print. F. Moras of Philadelphia, who did most of Woodward's chromolithographs in the *History*, was asked to do a print for Otis's *Circular 7* and later reprinting in the *History*. Otis requested multiple changes,

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51. Otis to Washburn, 23 May 1866, OHA 15.
51. Woodward to Billings, 18 September 1875, OHA 28.
53. Otis to Cassin, 3 November 1866, OHA 15.
54. Otis to Sinclair, 26 January 1876, OHA 15.
55. Otis to Rosenthal, 11 April 1867, OHA 15.

By this mail I send you a photograph and colored sketch of a patient exhibiting the results of a successful amputation at the hip-joint. I wish to have a chromolithograph prepared of this case to illustrate a circular about to be issued by this office... The photograph is poor, being enlarged from a carte de visite, and the colored sketch is execrable both in drawing and color. But they were the best pictures I could get of the case.

If possible, I wish to engage you to have a presentable drawing made from the photograph and water-color picture.

What I chiefly wish to illustrate is the appearance of the cicatrix and stump. The painter has rendered the appearance of the healed wound tolerably well, though his tints are bricky. He has dislocated the right ankle and knee by turning the foot out too far, and has immensely exaggerated the size of the face. Please to have an outline prepared for me of such a sketch as you would be pleased to have published over your name. Put some accessory such as your taste suggests in place of the unsightly table, and modify the dreadful formal floor. Leave out the gilt watch chain and substitute something for the particolored neck-tie. The vest must be of army blue. The background seems to me well enough. I like the arrangement of the shirt in the aquarelle better than in the photograph, though in the former it is brought down rather too low on the stump. With the aid of the photograph I have confidence that your artist can give a correct anatomical drawing, and I trust that he will also produce a pleasing chromo-lithograph...[56]

The first volumes

56. Otis to Moras, 25 January 1867, OHA 15.

For the next five years, the two men continued working on the first book in each of their respective specialties. Otis pointed out to inquirers, "The Medico-chirurgical history of the British Army in the Crimea was not published, if you recollect till 1858, while the French statistics on the same subject only saw the light a few months ago."[57] Assistant Surgeons like Woodhull and Curtis helped produce catalogs of the three collections in 1866 and 1867, with brief descriptions of cases that could be expanded on and woodcut illustrations that could be reused for the *History*. Otis produced another monograph, *Circular No. 2: A Report on Excisions of the Head of the Femur for Gunshot Injury* in January 1869. The amount of people working on such a large task was never very big. The maximum staff Otis had working on the project was "one medical officer, one clerk, and sixteen hospital stewards, occasionally aided by one acting assistant surgeon."[58]

1870 saw the publication of the initial parts in both the Medical and Surgical volumes of the *History* (fig. 31). Unfortunately an odd system was adopted: Woodward's book was designated Part I, Volume I Medical History, and Otis' work became Part II, Volume I Surgical History; for the sake of convenience they will be referred to here as first Medical, first Surgical, et cetera. On 8 June 1868, Congress appropriated money and authorized the Government Printing Office to print five thousand copies of each volume. Work began on 3 March 1869, and by November 1870 the books were completely done. Barnes, in his ornate style, states, "Through the liberality of the Government, in its beneficent pension laws, it has been found practicable to obtain accurate histories of many thousand wounded or mutilated men for years subsequent to their discharge from service. As in the official returns of the casualties of the French and English Armies in the Crimean War, the cases were dropped when the men were invalided, pensioned, or discharged from service, this information was considered peculiarly desirable."[59] Barnes's point, that these volumes were the first long-term follow-ups of surgical cases, sets

57. Otis to Lyster, 25 September 1865, OHA 15; the Crimean war was from 1853-1856.
58. *MSHWR*, Surgical I, p. xxvi.
59. *MSHWR,* Medical I, p. viii.

the stage for the development of modern medical studies conducted on groups over a period of years. Otis concurred with Barnes, stating, "Much important and otherwise unattainable information regarding the ulterior consequences of the more important and rare injuries has been collected by private correspondence with invalided soldiers and their surgical advisers. More than fifteen hundred cases have been examined in this way."[60] Otis also credited the "former medical officers of the Confederate army" for providing much information. He was also able to use Confederate hospital records that had been captured by the Union. Occasionally, Otis would even advertise in newspapers for information on specific cases. But the lion's share of information came from pension records. "[T]he principal sources from which the remote results of wounds, injuries, and operations were ascertained, were the reports of pension examiners, and communications from the surgeons general and adjutants general of States."[61]

Otis had changed the format and content of his volumes in the five years since *Circular 6* was published. The volumes were not arranged into one volume of graver injuries and one volume of lesser injuries, followed by a historical summary and a discussion of lessons learned. Nor were cases of injuries discussed followed by a separate discussion of treatments as in *Circular 6*. Instead, "As nearly as practicable, the wounds and injuries and surgical disease of each region of the body have been arranged together, as the simplest and most natural order that could be adopted. The most interesting clinical histories have been printed in full, or in abstracts including the attainable essential details, and the remaining cases, or sometimes the whole number of cases of the class, are set forth in tabular statements." In other words, each area of the body would have its wounds described and treatments discussed. Otis opened his book with a daily chronological summary of the battles and engagements the Army fought. Then he examined wounds of the upper body. Due to space limitations, in the first Surgical volume only the head, face, spine, and chest were included.

Whenever possible, the clinical histories were credited to the doctor who had treated the patient,

60. *MSHWR,* Surgical I, p. xix

preferably in his own words. After the information was presented, Otis discussed it, drawing conclusions and pointing out relevant facts. He was still planning to finish the Surgical section of the *History* in two volumes, but had been forced to move the 'Wounds and Injuries of the Head and Trunk' to the second Surgical volume due to space considerations.[62] Otis's volume was heavily illustrated with woodcut engravings, lithographs and chromolithographs of patients and specimens.

Otis was confident that the study of the war wounded would advance medical science and wrote, “That the experience acquired during the war should have added largely to every subject connected with military surgery was not to be anticipated. But it may be safely asserted that, in many directions, it has advanced the boundaries of our knowledge. ... [W]hile, before the war, there were few surgeons who chose to undertake operations on the great vessels [the arteries in the neck], there are now thousands who know well when and how a great artery shall be tied. ... Without further illustration, we may claim that the additions to surgical knowledge acquired in the war are of real and practical value.[63] Therefore, while "we must perhaps be content to wait until some genius as sublime as Newton's shall explain the laws of life by a generalization as simple and perfect as the law of gravitation, before the physiological sciences shall be recognized among the strictly exact sciences," Otis was confident that the study of the war wounded would advance medical science.[64] When President Abraham Lincoln was assassinated, Museum doctors performed his autopsy. Contributing to the knowledge of head wounds, Otis gave Lincoln a semi-anonymous entry (fig. 32) in the *History*: “Another case of alleged fracture by contre-coup of both orbital plates of the frontal by the transmitted shock from the perforation of the occipital by a pistol ball, has been much commented on: Case. --A. L-----, aged 56 years, was shot in the head, at Washington, on the evening of April 14th, 1865, by a large round ball, from a Derringer pistol, in the hands of an

61. Ibid.
62. Ibid., p. xxxii.
63. Ibid., p. xxix.
64. Ibid.

assassin...[65]" Otis devoted over a full page of small type to Lincoln's injury and autopsy.

Woodward, in contrast with Otis, continued his plan of doing a volume "consist[ing] of a series of statistical tables presenting a summary view of the facts embodied in the monthly reports made to the Surgeon General with regard to the Sickness of the Army, the Deaths, and the Discharges from service on surgeon's certificate of disability." He could do so because, unlike a surgical case that could take years for the final resolution of the injury, most medical cases ended relatively quickly. By doing the statistical work first (fig. 33), Woodward was able to report the primary cause of death in the Union Army was diarrhea and dysentery. As a result, he would concentrate the whole of the second Medical volume on those diseases (although he had planned to discuss all types of disease in the second volume and save a 'somewhat detailed account of the General Hospital System' for the third volume).[66] Woodward did not use any illustrations in his first volume except for charts and graphs.

In his statistics, Woodward included the fiscal year following the war, ending on 30 June 1866, "because, although after the close of the war the great volunteer army was disbanded with unprecedented rapidity, the unsettled state of the country rendered it necessary to keep a certain number of volunteer troops in service for some time after the cessation of actual hostilities, and it was thought that tables showing the sickness and mortality from disease during the year of peace following the war would be valuable for comparison with the diseases and deaths of similar bodies of troops in the same regions during the period of active operations."[67] Woodward split his statistics to show the differences between 'White' and 'Colored' troops (fig. 37). His justification was a humanitarian one: "Aside from all considerations of a scientific or historical nature, motives of humanity would seem to dictate that the statistics should be presented in the form most likely to render them serviceable as a contribution to our knowledge of the influence of race-peculiarities of disease. These motives acquire, if possible, additional importance from the fact that several thousand Colored Men still continue to form a part of the United

65. *MSHWR*, Surgical I, p. 305-6.
66. *MSHWR*, Medical I, pp. xiii, xlii, xliii, xxiv.
67. Ibid., p. xx.

States Army."[68] Woodward's volume closed with a 365-page appendix of the battlefield reports and maps (fig. 34) sent in by the doctors during the war. These are the reports and maps that Brinton had planned to use in his surgical history. Woodward and Otis compiled and edited them, observing "either a chronological or geographical sequence in the arrangement of the documents, in order to approximate a connected narrative."[69]

Writing during a memorializing age when much of Washington was being filled with statues of war heroes, Barnes hoped, "In carrying out the intentions of Congress, it has been my earnest endeavor to make this Medical and Surgical History of the War, not only a contribution to science, but an enduring monument to the self-sacrificing zeal and professional ability of the Volunteer and Regular Medical Staff; and the unparalleled liberality of our Government, which provided so amply for the care of its sick and wounded soldiers."[70] It seems that his wish came true; in 1875, Congress authorized the printing of another five thousand copies of the History, reserving four thousand for its own use and giving only one thousand to the Surgeon General.[71] This distribution system was not the best. Dr. A. T. Bartlett, a contributor to the Museum, contacted Otis for a copy of the History. Otis "referred him to his representative Mr. Morrison, but as he apprehended, being a republican, his application was unsuccessful." Otis recommended adding him to the Surgeon General's distribution list.[72] Surprisingly, extra copies of the second edition were still in stock in the Surgeon General's Library during World War II.[73]

Continuing the project

The second Surgical book (fig. 36) came out in 1876, six years after the first volume and eleven

68. Ibid., p. xiii.
69. *MSHWR*, Medical I Appendix, "Note by the editors."
70. Joseph K. Barnes, "Prefatory," *MSHWR*, Medical I, p. ix.
71. *MSHWR,* Surgical I, 2nd ed., Memorandum, p. 2.
72. Otis to Crane, 5 June 1876, OHA 15.
73. Wyndham Davis Miles, *A History of the National Library of Medicine: The Nation's Treasury of Medical Knowledge* (Bethesda: US Department of Health and Human Services, 1982), p. 286.

years after the end of the war. The same year Woodward was finally promoted to full Surgeon, thirteen years after being appointed Assistant Surgeon.[74] The rest of the *History* had been authorized by Congress in June, 1872, but Otis and his staff were unable to complete the remaining 1800 pages in the two years for which they had appropriations. Congress renewed their appropriation in June, 1875, with provisions made for a second edition, which was printed at the same time as the first. Six presses ran for four weeks at the Government Printing Office in early 1876 to print both editions.[75] Woodblock engravings, lithographs, chromolithographs (colored lithographs), and woodburytype and heliotype photomechanical prints were all utilized to illustrate the book (fig. 27), as they would be in the third Surgical and second and third Medical volumes. Continuing his survey of war wounds by body area, Otis covered injuries of the abdomen, pelvis, back and upper extremities (arms and hands) in this book. The amazing scope of the book can be seen from the 88,741 cases of wounds of the upper extremities reviewed, 817 of them in detail.[76]

Woodward followed Otis by three years and put his second book out in 1879, "with much labor and after serious interruptions" such as designing the Army's medical exhibits for the 1876 Centennial Exposition in Philadelphia. The topic of diarrhea and dysentery had proven larger than he had expected in 1870. The "alvine fluxes," as Woodward referred to them, took up the entire volume, forcing him to move to a third book the rest of the diseases that affected the army. Woodward felt that the discussion of the rest of the diseases, the camp fevers and scurvy among others, would not be discussed as exhaustively as the fluxes which caused 1,739,735 illnesses with 44,558 deaths in the Union Army alone.[77] Woodward's 314-page exploration of the pathology and almost 200-page discussion of treatments, including local bloodletting, antimony, castor oil, opium, alum, arsenic, and enemas, are a massive statement of medical

74. Woodward to Thomas M. Vincent, 29 July 1876, OHA 28.
75. Otis to Crane, 26 February 1876, OHA 15.
76. *MSHWR*, Surgical II, p. III.
77. Hemmeter, "Joseph Janvier Woodward," p. 640.

knowledge at the time of the war.[78] Woodward labored, as had every physician before him and almost none after him, under the difficulty of not knowing what caused disease. He wrote, “Undoubtedly, the chief reason why our best preventive measures fall so far short of our needs is because we have so little exact knowledge of the causes of disease. I know it is fashionable for certain sanitarians to talk flippantly in public addresses, as if we knew all about these causes, and I am often moved by scorn and pity at the complacency with which they utter their platitudes.” [79]

For the second edition of the first Surgical volume and the second and third Surgical volumes, Otis had most of the chromolithographs done by Thomas Sinclair (fig. 26). Bien, described by Otis in 1867 as "the best lithographer we employ," could not meet Sinclair's prices.[80] Bien and Sinclair were the only lithographers Otis used after the first edition of the first Surgical volume. Woodward had his chromolithographs done by F. Moras. The colors were supervised on contract by Hermann Faber, who had done the original artwork a decade earlier while at the Museum.[81] For the second book in both the Medical and Surgical series, Otis and Woodward began using woodburytype photomechanical prints in place of black and white lithographs. The woodburytype looks extraordinarily like a photograph, tipped-in on the page (fig. 28). Walter B. Woodbury patented the process in 1864. John Carbutt bought the American rights to the process. In Philadelphia, he established the American Photo-Relief Printing Company, and in 1871, he was able to begin printing.[82] Carbutt began working for the Museum that year, printing a plate for Woodward's *Report to the Surgeon General of the United States Army on an Improved Method of Photographing Histological Preparations by Sunlight*.[83] Like the lithographers, Carbutt printed the plate page titles, tipped-in the woodburytype and returned a completed page for binding by the

78. *MSHWR,* Surgical II, p. iii-x.
79. Woodward to Bowditch, 19 January 1876, OHA 28.
80. Otis to Sinclair & Son, 17 August 1874; Otis to Fauntleroy, 22 May 1867; Otis to Bien, 19 September 1874, all OHA 15.
81. Woodward to Moras, 3 July 1875, OHA 28.
82. Ibid., p. 204.
83. Woodward to Barnes, 4 March 1875, OHA 28.

printers. Surprisingly enough, the cost for a reproduction as either a lithograph or a woodburytype was about the same. Otis said, "By either method the editions would cost about three hundred and fifty dollars for five thousand and a little less than double that amount for ten thousand copies."[84] Otis preferred to use woodburytypes (fig. 29), writing to Carbutt, "...I have regarded this process as most valuable for scientific illustrations, and have wished to largely avail of it."[85] Unfortunately, in early 1875, Woodward began finding problems with his prints lifting off the paper support and while first editions of the History were illustrated mostly with the woodburytypes, the second had many of them replaced by another photomechanical process or lithographs (fig. 30). The second Surgical volume (1876), second Medical volume (1879), third Surgical volume (1883) and third Medical volume (1888) all have some tipped-in woodburytype prints since Woodward and Otis had purchased enough of some of the plates for both editions. In spite of Woodward's fears, the woodburytype prints in the books remain in excellent shape, and today still closely mimic a photograph.

When neither Woodward nor Otis survived to complete the final volumes in their series, the Surgeon General was forced to find replacements for them. Upon Otis's death in 1881, his third volume was finished by Dr. David L. Huntington (fig. 38), who replaced him as Curator of the Museum. Another University of Pennsylvania graduate, he had served during the war with Grant and Sherman. After the war, he served at various posts and was in charge of the Soldier's Home in Washington from 1875 until 1880.[86] Huntington completed the volume, much of which was probably already done, in 1883. Huntington said, "no change in, or deviation from, the original plan has been attempted; that, so far as known, his [i.e. Otis] wishes and intentions with regard to the arrangement and development of the History have been scrupulously regarded." Huntington was helped by the Museum's chief clerk, C.J. Meyers, who had been assisting on the *History* since its beginning. As Otis had desired, the third book

84. Otis to Barnes, 24 November 1874, OHA 15.
85. Otis to Carbutt, 15 February 1875, OHA 15.

covered the lower extremities, the legs and feet. Sections on bullets, operations and treatments, surgical tools, surgical diseases, and anesthetics were included. The section on anesthetics contained the interesting conclusion that ether and chloroform "were used in no less than eighty thousand (80,000) instances."[87] The book ended with a “brief historical sketch of the Medical Staff” explaining how the Army's system was modified for the war. The final part, with some of the engravings dating from *Circular 6*, is a comprehensive overview of the large-scale evacuation of the wounded that was first practiced during the Civil War. Huntington, echoing Barnes's wish of thirteen years earlier, said, "It is hoped that its short-comings may not seriously impair or detract from the beauty and harmony of the masterpiece, which must remain a living monument to the intelligent industry, perseverance, and professional learning of the late Surgeon GEORGE A. OTIS."[88]

Woodward died on Sunday, 17 August 1884, after a series of illnesses. He was succeeded in his work by Dr. Charles Smart, another veteran of the war. Smart had not wanted the assignment. "In July, 1883, the late Surgeon General CRANE expressed to me his desire that I should undertake the *Third Part* of the work; and, in view of my reluctance to assume this heavy responsibility, he gave me to understand that his wish in this instance was intended to carry the weight of an order." Crane imposed no conditions on the contents of the book except that the plates that Woodward and Faber had begun working on so long ago were to be used. Smart adhered to Woodward's original plan for the third volume published in 1888. He used most of the volume to discuss fevers such as malaria, typhoid, typhus, measles, smallpox, scarlet fever, yellow fever and mumps. All of these were considered the ‘miasmatic fevers.' Miasmas were thought to be emanations from the toxic ground that caused diseases. Smart continued the historic error of grouping diseases by their clinical effect on the body as these diseases have little in common. After the fevers, Smart looked at other diseases common to armies, such as scurvy, consumption

86. Albert Allemann, “Huntington, David Low (1834-1899)” in Howard A. Kelly and Walter L. Burrage, *American Medical Biographies* (Baltimore: Norman, Remington Company, 1920), p. 581.
87. *MSHWR*, Surgical III, p. 887.

(tuberculosis), and pneumonia. A short chapter included perennial military problems such as nostalgia (depression due to homesickness), army itch (an ill-defined skin disease), alcoholism and venereal disease.[89] The book closed with the valuable, and even then, historic, discussion of general hospitals that Woodward had worked on twenty-three years earlier in *Circular 6*. This final volume brought to a close the Museum's main interest in the Civil War, an ending underscored by the Museum's move into a new building near the Smithsonian Castle (fig. 39).

It is difficult to say how useful the *History* was. Some dismissed it as a "mere compilation of other people's writings."[90] But there was enough interest in the set to require a second edition even before the first had been distributed. Although Woodward felt that more attention was paid to their work in Europe than America, contemporary reviews of the volumes were favorable. *The Philadelphia Medical Times* had a typical response, "We think that a just pride will be felt by the American medical profession, and indeed by our countrymen generally, in these admirable volumes." George Shrady's editorial in the *Medical Record* concluded:

> These documents illustrate the real medical history of the war. They are most interesting and valuable historical records, and indicate a high degree of intelligence, not alone professional, but administrative, military, and comprehensive. They show that the profession of the country, whether trained in the army, in metropolitan centres, or sparsely and recently settled districts, was capable of grasping and dealing with the great emergency in which the country found itself suddenly involved. They breathe the purest spirit of humanity irrespective of politics, and reveal a high degree of cultivation of both mind and heart. They indicate a degree of medical culture

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88. Ibid., p. iii-iv.

89. The rate for white troops was 8.2% versus 8.7% before the war. The rate for colored troops was considerably lower at 3.38% for syphilis and 4.39% for gonorrhea. See *MSHWR*, Surgical III, p. 891.

90. Henry, *The AFIP*, p. 89, quoting the *Washington Sunday Herald,* 1 April 1883.

> beyond what we are apt to acknowledge in our periodical onslaughts on the medical colleges. More than this, they display the acute practical common-sense of the American *mind* which often rises to the level of genius. The war developed first-class soldiers, and first-class military surgeons, out of what, at first sight, and to a European, would have seemed the most unpromising and even hopeless material.[91]

Only two slightly critical reviews are preserved in the Museum (which did keep critical notices). One British reviewer from *The Lancet*, thought "Dr. Otis criticises (sic) with some little asperity certain statements made by Professor Longmore..." *The North Western Medical and Surgical Journal* felt "both volumes are as handsome as they are valuable, except the bindings which are only worthy of a cheap novel."[92]

Although Otis frequently referred to himself as the editor of his volumes, this simplistic view does not acknowledge the massive amount of information digested and the great knowledge that both Otis and Woodward brought to their task. Woodward and Otis were writing just at the dawn of a great revolution in medical thought and can hardly be held accountable for not foreseeing the basic tools and principles of modern medicine. No one could have predicted the x-ray. Woodward certainly laid some of the foundations for pathology and histology in his work, while Otis clearly showed that a conservative approach to surgery aided the patient. The careful and extensive research that he and Otis did, reviewing literally everything written on a topic, would never be equalled again and is certainly not possible now. The great pathologist Rudolf Virchow said of the *History*, “Whoever takes up and reads the extensive publications of the American medical staff will be constantly astonished at the wealth of experience

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91. “Reviews and Book Notices,” *Philadelphia Medical Times,* 26 April 1873; George F. Shrady, “The Medical and Surgical History of the War of the Rebellion,” *Medical Record,* 15 April 1873. Copies in OHA 18: Curatorial Records: Notices of Army Medical Museum Publications, 1865-1881.

92. “Reviews and Notices of Books, *The Lancet*, 30 August 1873, p. 303; “Reviews and Book Notices,” *The North*

therein found. The greatest exactness in detail, careful statistics even in the smallest matters, and a scholarly statement embracing all sides of medical experience are here united, in order to preserve and transmit to contemporaries and posterity in the greatest possible completeness, the knowledge purchased at so vast an expense."[93] William Gerry Morgan, president-elect of the American Medical Association, wrote in 1930 that the *History* "is still a valuable source of information for the physician whether in the military service or in civil practice."[94] Dr. John C. Hemmeter, author of *Diseases of the Intestines*, surveyed Woodward's work on the second Medical volume in 1923. Hemmeter concedes that Woodward did not realize that bacteria caused dysentery and diarrhea, but points out that neither did anyone else in the 204 years that passed between Leuwenhoeck's sight of bacteria through a microscope and Woodward's publication of his work. Hemmeter continues, "In America, it was largely due to Surgeon General Geo. Miller Sternberg (1838-1915) and to J.J. Woodward that American medical schools were led to accept the great importance of bacteriology as an absolutely necessary science for the understanding of diseases. ...J.J. Woodward deserves the credit for his diligent and penetrating research into the bacteriological literature of the world of his day, for the direct applications of this science to the causation and treatment of intestinal diseases."[95] Victor C. Vaughn, author of *Epidemiology and Public Health*, wrote to Hemmeter, "I do not think that you can say anything too eulogistic of Woodward. He certainly was far ahead of his time and the *Medical and Surgical History of the War of the Rebellion* is a monument to his learning and industry."[96]

Certainly the philosophy of the *History* survived, even though its exact format -- a survey of the entirety of medical literature and discussion of hundreds of individual soldiers' cases -- became less

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Western Medical and Surgical Journal, *3*, p. 484. Copies in OHA 18: Curatorial Records: Notices of Army Medical Museum Publications, 1865-1881.

93. Henry, *AFIP*, p. 90.

94. William Gerry Morgan, "Contributions of the Medical Department of the United States Army to the Advancement of Knowledge," *Military Surgeon*, 1930, *66*, (6; June), 779-790, p. 781.

95. Hemmeter, "Joseph Janvier Woodward," p. 639.

possible and less necessary. The Surgeon General's Office produced the fifteen-volume *Medical Department of the United States Army in the World War*. The Army's Center for Military History produced the large series *Medical Department U.S. Army World War II* and individual volumes on specific medical aspects of both the Korean and Vietnam wars. The Textbook of Military Medicine series, currently being produced by the Surgeon General's Office's Borden Institute,[97] mostly draws lessons from the Vietnam and Iraq wars, but displays its lineage by including information on gunshot wounds abstracted from the *History*. The *History*, intended as a reference work and a monument, succeeded as both and remains a unique history, even now that advances in medicine and surgery have made much of its hard-won knowledge obsolete.[1]

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AUTHOR'S NOTE: (December 3, 2025): This paper was last modified in 2009 for possible publication, but it was not accepted. Recently I became aware that it was not available online. I have added the images from the original lecture into the text as figure numbers with the actual images appended at the end of the document. Aside from that, only slight copyediting was done to create this version.

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96. Ibid., p. 643-4.
97. For more information on current publications, see http://www.bordeninstitute.army.mil/.

PART SECOND
SURGICAL VOLUME
SURGICAL VOLUME
MEDICAL VOLUME

entered De Camp, David's Island, New York Harbor. On September 19, 1865, the man was discharged from service and pensioned. The upper portion of the bones of the leg of the amputated limb were forwarded to the Museum by the operator, and are represented in FIGURE 184, and a cast of the stump was contributed by Acting Assistant Surgeon G. F. Shrady. (*Cst. Surg. Sect.*, 1866, p. 548, *Spec.* 1787.) The New York City Examining Board certified, March 11, 1874: "The pensioner is unable to wear an artificial limb in consequence of excessive tenderness of the stump, rendering him unable to stand the pressure upon it. He has tried one several times, but it was so painful that he could not wear it more than a few hours." This pensioner died November 12, 1877, of phthisis pulmonalis.

Fatal Cases of Primary Amputation in the Lower Third of Femur.—Six of the nine hundred and twenty-seven cases of this group were instances of double amputations; the operations were, therefore, performed on nine hundred and twenty-one patients. Seven hundred and ninety were Union, and one hundred and thirty-one were Confederate soldiers. In the following case both thighs[1] were amputated in the lower third on the day of the injury, the patient surviving the operations eighteen days:

CASE 451.—Private D. Nicholson, Co. H, 22d Massachusetts, aged 23 years, was wounded in both thighs, at Spottsylvania, May 10, 1834. He was admitted to the field hospital of the 1st division, Fifth Corps, where Surgeon J. Thomas, 118th Pennsylvania, amputated both limbs. Surgeon R. B. Bontecou, U. S. V., reported the following termination of the case: "The patient entered Harewood Hospital, Washington, May 25th. He had undergone amputation of both thighs at the lower third the same day he received the wound, the operations being performed by the antero-posterior flap method. When admitted he was in a very weak condition, the stumps being unhealthy and showing a tendency to slotgh. A supporting treatment was administered. Progress, however, continued unfavorable. Death occurred from exhaustion May 28, 1864." The amputated portions of the femurs were contributed to the Museum by the operator, and constitute Specimen 2906 of the Surgical Section (FIGS. 186, 187), showing the right femur to be transversely perforated, with comminution, two inches above the condyle, by a bullet which passed on, badly grooving the left femur on the anterior face at the same level and producing a severe oblique fracture.

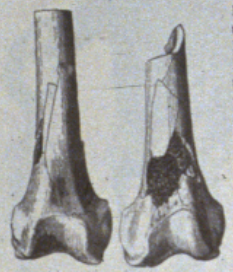

FIG. 186.—Anterior view of lower third of each femur. *Spec.* 2906.

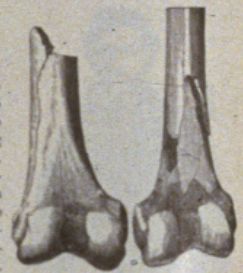

FIG. 187.—Posterior view of lower third of each femur. *Spec.* 2906.

CASE 452.—Private J. O. Blackburn, Co. E, 138th Pennsylvania, aged 35 years, was wounded at Monocacy Junction, July 9, 1864, and admitted to hospital at Frederick on the following day. Assistant Surgeon R. F. Weir, U. S. A., reported the following history: "The injury was caused by a fragment of a shell, which struck the inner side of the left knee, lacerated the soft parts, and comminuted the joint. On the day after his admission the patient was etherized, and the thigh was removed at the lower third, by Acting Assistant Surgeon W. S. Adams. The integuments in this case being in bad condition on the inner side, a circular incision was made to extend half around the limb, a long lateral flap on the outer side and a circular incision through the muscles, and the parts united by sutures and adhesive straps. The patient's condition at the time of the operation was very poor. July 13th, patient irritable; pulse 120; appetite rather poor; no effort at union by first intention. 16th, some evidence of sloughing of the flap. Ordered yeast poultices, also tartrate of potassa and iron in doses of twenty grains three times a day, and continued the stimulants and generous diet. 20th, line of demarcation well marked. 22d, slough being detached at several points; clipped it off with scissors down to the bleeding surface and thoroughly applied oakum saturated with a strong solution of permanganate of potassa, covering the whole with oiled silk. 25th, slough came away nicely, leaving a clean healthy surface. August 1st, patient doing tolerably well; granulations somewhat abundant but pale and flabby. Has obstinate diarrhœa, and is taking opiates and astringents in addition to other treatment. 10th, diarrhœa partially checked; appetite very poor; sloughing has recommenced, and permanganate of potassa is reapplied. 15th, sloughing about ceased. There is but little discharge, and the end of the stump is dry and refuses to granulate. Applied yeast poultice and continued the other treatment. 21st, patient quite despondent and evidently failing rapidly; pulse 140 and scarcely perceptible. Increased the stimulants. 28th, sloughing still continues and patient sinking. 31st, had a hemorrhage from femoral artery to amount of eight ounces; controlled by tourniquet. Hemorrhage occurred again on the following morning and was arrested by the tourniquet, the patient not being in condition to undergo ligation. He died at 7 o'clock P. M., on September 1, 1864. At the autopsy, eight hours after death, the body was found to be much emaciated and the muscles remarkably loose and flabby. On examining the stump to the head of the bone and removing the femoral artery and vein, the end of the artery was found to be pervious from the breaking down of the clot, and the vein much thickened and indurated." The amputated extremity of the femur, showing the inner condyle to be superficially fractured (*Spec.* 3834), and four and a half inches of the stump of the bone, being superficially necrosed (*Spec.* 3488), together with the femoral artery (*Spec.* 3980), were contributed to the Army Med. Museum by the operator.

[1] The remaining five fatal cases of amputation of both thighs in the lower third of the femur are: Pt. S. Allen, G, 20th Mass (No. 989, TABLE XXXII, p. 239); Pt. R. S. Michael, A, 105th Penn. (No. 1351, TABLE XXXII, p. 263); Serg't E. C. Stebbins, B, 19th Missouri (No. 1459, TABLE XXXII, p. 266); Pt. J. Stewart, B, 77th New York (No. 1780, TABLE XXXII, p. 285); and Lieut. J. Whelpley, D, 1st Maine (No. 1882, TABLE XXXII, p. 287).

TABLE XXXII.

Summary of Nineteen Hundred and Fourteen Cases of Primary Amputations in the Lower Third of the Femur for Shot Fracture.

Recoveries, 1—972; Deaths, 974—1909; Result unknown, 1911—1914.

No.	NAME, MILITARY DESCRIPTION, AND AGE.	DATES.	OPERATIONS, OPERATORS, RESULT.
1	Abbott, O. A., Serg't, A, 16th Conn.	Oct. 27, '18, '64.	Left; circ. Surg. F. A. Dudley, 16th Conn. Died of shock June 9, '65.
2	Adair, R., Serg't, F, 7th Infantry.	Feb. 21, '22, '65.	Right; circ. A. Surg. B. Norris, U. S. A. Died of July 13, '65; subsequent operation.
3	Adams, E. H., Pt., C, 12th Iowa.	June 6, '6, '63.	Left; flap. Surg. A. H. Hoff, U. S. V. Died of Sept. 22, '63.
4	Aderhold, E., Pt., E, 6th Penn. Reserves.	Oct. 14, '14, '63.	Left. Died of May 2, '64. Died Jan. 23, 1865.
5	Agnew, A., Pt., C, 7th Kentucky.	Mar. 27, '27, '63.	Right; circ. Surg. A. T. Bartlett, 53d Mo. Died of June 14, 1865.
6	Aikman, *J. J.* Serg't, K, 4th Miss., age 32.	Nov. 30, Dec. 1, '64.	Right; anterior post. flap. Surg. McCormick, U. S. A., Provost Marshal March 7, 1865. Died of
7	Aldrich, R., Pt., A, 153d N. York.	July 9, '11, '64.	Left; ant. post. flap. A.-A. Surg. W. S. Adams. Died of. *Spec.* 2936.
8	Alexander, G., Pt., A, 4th Virginia, age 20.	May 3, '4, '63.	Right; flap. Recovery with good stump.
9	Allen, J., Corp'l, F, 93d Illinois, age 18.	Sept. 19, '27, '63.	Right; flap. Surg. T. L. Magee, 51st Ill. Died of Feb. 27, 1864.
10	Allen, J. G., Pt., A, 77th New York, age 20.	June 27, '23, '64.	Left; ant. post. flap. Surg. G. T. Stevens, 77th N. Y. Died of Sept. 9, 1864.
11	Allen, R., Serg't, A, 20th Illinois, age 24.	Dec. 13, '15, '64.	Right; circ. Died of July 1, '65.
12	Ammerman, G., Corp'l, C, 6th Penn. Reserves, age 26.	May 6, '6, '64.	Left; ant. post. flap. Surg. C. Brewer, 6th Penn. Res. Died of May 26, 1865.
13	Anderson, J., Pt., I, 21st Ohio.	Jan. 3, '3, '63.	Left; flap. Died of March 13, 1863.
14	Anderson, S., Pt., I, 21st Kentucky.	June 26, '27, '64.	Left; flap. Surg. C. J. Walton, 21st Ky. Mast. out Jun. 23, '65.
15	Andrews, A. C., Pt., H, 5th Mass., age 21.	Feb. 6, '6, '65.	Right; flap. June 10, transp. two and a half hs. A. A. Surg. E. R. Lyon. Died of Oct. 23, '65.
16	Angle, H., Pt., F, 26th Wisconsin, age 21.	May 5, '5, '64.	Left; circ. Died of May 30, '64.
17	Anthony, A., Lieut., E, 2d S. C., age 21.	Mar. 25, '25, '65.	Left; circ. A. Surg. E. P. Brehe, 55th Mass. Resigned July 10, '65.
18	Anthony, H. L., Pt., C, 5th Vermont, age 24.	June 16, '16, '64.	Left; circ. Surg. B. Phillips, 6th Vt. Died of July 1, 1865.
19	Anthony, *R. H.*, Pt., D, 1st Tennessee.	July 1, '2, '63.	Left. Surg.—McGuire, U. S. A. Exch'd March 17, 1864.
20	Armstrong, G., Pt., I, 62d Penn., age 18.	July 3, '3, '63.	Left. Dec. Cl. exhd. removed. Died of Oct. 13, '64. Spec. 2136.
21	Armstrong, J. A., Pt., H, 2d Minn., age 24.	May 12, '14, '64.	Right; double lat. flap. Surg. J. S. Bloss, 11th N. H. Died of Nov. 16, 1864.
22	Ash, J., Pt., G, 25th S. Carolina, age 30.	May 16, '16, '64.	Left; circ. Furloughed July —, 1864.
23	Ashby, D. C., Lieut., H, 8th Indiana, age 24.	Dec. 13, '17, '64.	Right; Vermale's method. Ast. Surg. W. B. Trull, U. S. V. Mustered out May 13, 1865.
24	Ashhurst, J. C., Corp'l, B, 14th W. Va., age 25.	Oct. 19, '20, '64.	Left; circ. Died of June 5, '65.
25	Atkins, C. S., Serg't, D, 6th Kans. Cav., age 22.	July 27, '27, '64.	Right; flap. Surg. C. E. Swasey, U. S. V. Aug. 2, hem.; artery secured. Died of Aug. 3, 1864.
26	Atwell, W. P., Lieut., D, 27th Wis., age 19.	July 30, '30, '64.	Right. Died of Nov. 25, 1865. 1871, not in good condition.
27	Avery, H., Serg't, G, 28th Penn., age 21.	May 25, '5, '64.	Left. Surg. R. R. Goodman, U. S. V. Mustered out July 1865.
28	Ayres, D. C., Pt., I, 102d Penn., age 26.	Nov. 30, '3, '64.	Left; circ. Died of Mar. 13, '65.
29	Bacon, G. F., Pt., A, 10th Maine, age 18.	Mar. 31, '31, '65.	Left; flap. Died of July 25, '65.
30	Bailey, J. W., Pt., A, 1st U. S. Sharpshooters.	Aug. 29, '29, '62.	Right; circular. Discharged.
31	Bakeman, G. A., Pt., F, 73d Pennsylvania.	Nov. 27, '28, '63.	Left; flap. Surg. M. Risse, 73d Penn. Mustered out Aug. 24, 1864. *Spec.* 1982.
32	Baker, H. C., Pt., F, 97th North Carolina.	June 27, '27, '63.	Right. Surg. Gibbon, C. S. A. Recovered.
33	Baker, J. D., Pt., H, 6th Iowa, age 19.	Nov. 24, '24, '63.	Left; circ. Surg. M. W. Robbins, 6th Iowa. Died of July 17, 1864.
34	Baker, J. W., Lieut., A, 14th Indiana.	Dec. 13, '13, '63.	Left. Died of February 1, 1865.
35	Baker, S., Pt., K, 105th N. Y. V. A., age 18.	Oct. 7, '7, '64.	Right; flap. Oct. 10, hæm. and ligature. Died of Oct. 3, 1865. *Spec.* 3765.
36	Baldwin, C., Corp'l, H, 28th Penn., age 21.	June 1, '1, '64.	Left; ant. post. flap. Surg. H. C. Chetney, 28th Pa. Died of Feb. 4, 1865.
37	Baldwin, *P. B.*, Serg't, D, 40th Alabama.	June 17, '17, '64.	——. Surg. — Cook, 47th Alabama. Recovered.
38	*Ballentine, H. J.*, Lieut., B, 45th Penn., age 29.	Nov. 23, Dec. 1, '64.	Left; circ. Prov. Marshal June 5, 1865.
39	Bangs, L. G., Adj't, 19th Illinois, age 27.	Nov. 24, '24, '63.	Right; circ. Surg. F. H. Gross, U. S. V. Erysipelas. Mustered out July 9, 1864.
40	Bappert, M., Pt., G, 67th Ohio, age 18.	Aug. 3, '3, '64.	Left; flap. Surg. S. P. Bonner, 67th Ohio. Aug. 18, oper. May 30, '65, see bone rem'd. Disch'd June 3, 1865.
41	*Barclay, T.*, Pt., K, 14th Louisiana.	Nov. 27, '28, '63.	——. Surg. — White. Recovery.
42	*Barker, H.*, Pt., H, 21st Virginia.	Oct. 19, '20, '64.	——; circular. Dr. G. L. Miller. Transferred.
43	Barnes, *J. E.*, Serg't, A, 77th New York, age 27.	June 27, '27, '64.	Left; ant. post. flap. Surg. G. T. Stevens, 77th N. Y. Died of Oct. 26, 1864.
44	*Barrett, M.*, Corp'l, E, 15th Alabama.	Sept. 19, '19, '63.	——. Amputation. Transferred to hospital Oct. 3, 1863.
45	Bartle, W., Serg't, H, 86th New York, age 25.	Nov. 17, '17, '64.	Left; circ. Surg. O. I. Owens, 86th N. Y. Died of June 6, '65. *Spec.* 4129.
46	Bastian, J., Pt., A, 21st Illinois.	June 27, '27, '64.	Right; circ. Surg. J. Reeves, 79th Ohio. M. out May 31, '65.
47	Bauer, J., Pt., F, 106th New York.	July 22, '22, '63.	Left; ant. flap. Surg. M. S. Kingsley, 106th N. York. Died of May 2, 1864.
48	Baughman, C., Pt., H, 1st Mich. Art., age 26.	Nov. 22, '22, '64.	Right; ant. post. flap. Surg. A. T. Hudson, 26th Iowa. Disch'd June 3, 1865.
49	Beall, T., Pt., G, 30th Iowa, age 28.	Oct. 5, '7, '64.	Left. Surg. J. R. Keating, 27th Illinois. Died of July 8, 1865.
50	Bean, C. H., Pt., E, 11th Maine, age 19.	July 21, '21, '64.	Left; flap. Surg. N. F. Blunt, 17th Me. Died of June 10, '65.
51	Beightal, J., Pt., C, 93d Penn., age 20.	Mar. 25, '25, '65.	Right; flap; erysipelas. Died of July 12, 1865.
52	Bellas, J., Bugler, A, 1st Michigan Battery.	Oct. 8, '8, '62.	Left; circ. Surg. C. S. Mosenfelder, 10th Ohio. Died of June 7, '63.
53	Bell, G. W., Pt., H, 30th Ohio, age 26.	July 22, '22, '64.	Right; flap. Surg. J. N. Zentzig, 57th Ill. Died of June 17, '65.
54	Bell, *J. H.*, Pt., E, 12th Alabama.	Aug. 16, '16, '64.	Left; circ. Surg.—— ——, 12th Ala. Distr. Trans. Aug. 31, '64.
55	Bellamy, R., Pt., I, 4th Delaware, age 45.	July 25, '25, '64.	Right; circ. Surg. D. A. Chamberlain, 94th N. York. Disch'd July 15, 1865.
56	Bergman, P. P., Serg't, H, 3d Mich., age 27.	Aug. 28, '28, '63.	Right; flap; abscesses. V. R. C. 1865.
57	Berry, W. F., Pt., Pursell's Battery.	July 1, '1, '63.	Left. Recovery.
58	Besserman, D., Pt., H, 107th Penn., age 23.	July 10, '10, '64.	Left; circ. Disch'd July 11, '65.
59	Bethel, *J. F.*, Corp'l, G, 60th Virginia Cavalry.	Sept. 20, '20, '64.	——. Surg. — Sievers, C. S. A. Recovery.
60	Billingsley, S. A., Pt., C, 11th Maine, age 26.	Oct. 27, '27, '64.	Left; flap. Surg. N. Y. Lell, 70th Penn. Disch'd June 12, 1865.
61	Billingsley, J. B., Pt., I, 43d Alabama, age 22.	May 16, '16, '64.	——; circ. Surg. Hilliard, C.S.A. Recovery.
62	Bish, A., Pt., G, 126th Penn., age 25.	Oct. 27, '28, '64.	Left; circ. Union by first intention. Disch'd March 17, 1865.
63	Bishop, J. H., Serg't, F, 16th Kentucky.	Aug. 30, '30, '63.	Left; flap. A. Surg. J. D. Gatch, 16th Indiana. Discharged.
64	Bishop, H., Pt., A, 88th Penn., age 20.	Dec. 13, '13, '62.	Left; flap; gang. May 1, seq. rem. Disch'd Dec. 17, '62. *Spec.* 1264.
65	Black, W. E., Serg't, G, 67th Penn., age 23.	April 6, '7, '65.	Right; ant. post. flap. A. Surg. T. F. Corbin, 67th Penn. Discharged July 7, 1865.
66	Blanchard, C. H., Pt., F, 30th Mass., age 19.	Oct. 19, '19, '64.	Right; circ. Confed. Surgeon. Died June 9, 1865.
67	Blanchard, W., Pt., B, 99th N. York, age 22.	Oct. 19, '19, '64.	Left; flap. Disch'd July 4, 1865.
68	Blackburn, J. G., Pt., D, 3d Missouri.	Oct. 4, '4, '64.	Recovery.
69	Bliven, C. J., Pt., K, 4th Rhode Island, age 21.	July 30, '30, '64.	Left; circ. A. Surg. R. Miller, 4th R. I. Sub. operat's. Disch'd June 23, 1865.
70	Blossom, W. E., Pt., G, 104th N. York, age 24.	Dec. 5, '5, '64.	Left; bilat. oval flap. Surg. N. B. Barnes, 104th N. Y. Died of June 15, 1865.
71	Boardman, T., Pt., A, 2d Massachusetts.	June 27, '28, '62.	Right. Surg. E. Bentley, U. S. V. Two sch. op. Dis'd May 2, '64.
72	Bolles, G. W., Pt., D, 44th Ala., age 20.	Sept. 20, '20, '64.	Left. To Provost Marshal March 14, 1864.
73	Boland, J. C., Lieut., E, 40th New York, age 20.	May 5, '5, '64.	Left; ant. post. flap. Surg. W. B. Fox, 8th Mich. Died of Nov. 27, 1864.
74	Bonnell, W. D., Pt., G, 133d N. York, age 21.	Aug. 14, '14, '64.	Left; flap. Confed. Surg. Nov. Died of May 8, 1865.

[1] THIGH (C.). *Report of Wounded treated in Field Hospital of Stoneman's Division, etc.*, in *Conf. States Med. and Surg. Jour.*, 1864, Vol. I, p. 75.

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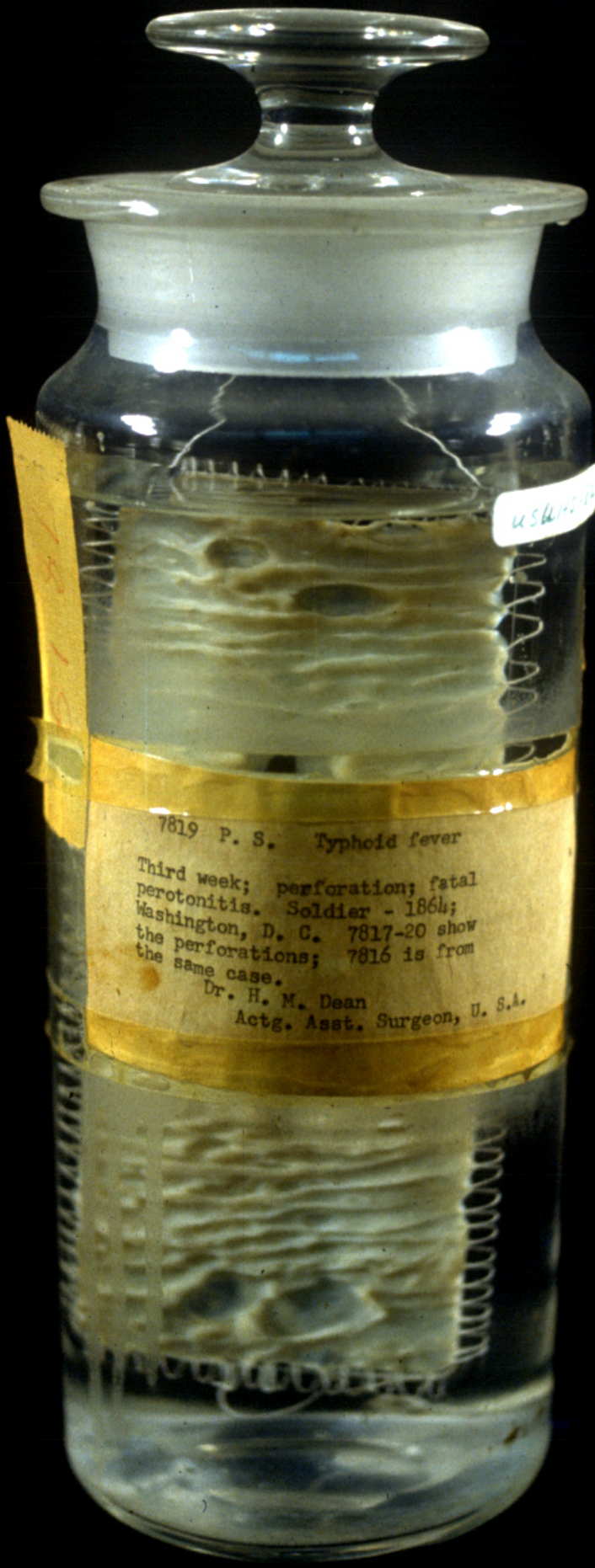
XII A


7819 P. S. Typhoid fever
Third week; perforation; fatal perotonitis. Soldier - 1864; Washington, D. C. 7817-20 show the perforations; 7816 is from the same case.
Dr. H. M. Dean
Actg. Asst. Surgeon, U. S.A.

Circular No. 5.

Surgeon General's Office,

WASHINGTON, D. C., *June* 9, 1862.

It is intended to prepare for publication the Medical and Surgical History of the Rebellion.

The Medical portion of this work has been committed to Assistant Surgeon J. J. WOODWARD, United States Army, and the Surgical part to Brigade Surgeon JOHN H. BRINTON, United States Volunteers.

All medical officers are therefore requested to co-operate in this undertaking by forwarding to this Office such sanitary, topographical, medical and surgical reports, details of cases, essays, and results of investigations and inquiries as may be of value for this work, for which full credit will be given in the forthcoming volumes.

Authority has been given to both the above named gentlemen to issue, from time to time, such circulars as may be necessary to elicit the desired facts, and the medical officers are desired to comply with the requests which may thus be made of them.

It is scarcely necessary to remind the medical officers of the regular and volunteer services that through the means in question much may be done to advance the science which we all have so much at heart, and to establish landmarks which will serve to guide us in future.

It is therefore confidently expected that no one will neglect this opportunity of advancing the honor of the service, the cause of humanity, and his own reputation.

WILLIAM A. HAMMOND,

Surgeon General, U. S. Army.

CIRCULAR No. 6.

WAR DEPARTMENT,

SURGEON GENERAL'S OFFICE,

Washington, November 1, 1865.

WOODWARD, J. J., ed.

REPORTS

ON THE

EXTENT AND NATURE OF THE MATERIALS

AVAILABLE FOR THE PREPARATION

OF A

MEDICAL AND SURGICAL HISTORY

OF

THE REBELLION.

R. S. L.

PRINTED FOR THE SURGEON GENERAL'S OFFICE
BY
J. B. LIPPINCOTT & CO.
PHILADELPHIA.
1865.

SURGEON GENERAL'S OFFICE,
WASHINGTON, D. C.,
November 1st, 1865.

The following Circular is published for the information of the Medical Officers of the Army.

JOSEPH K. BARNES,
SURGEON GENERAL.

CIRCULAR NO. 6.

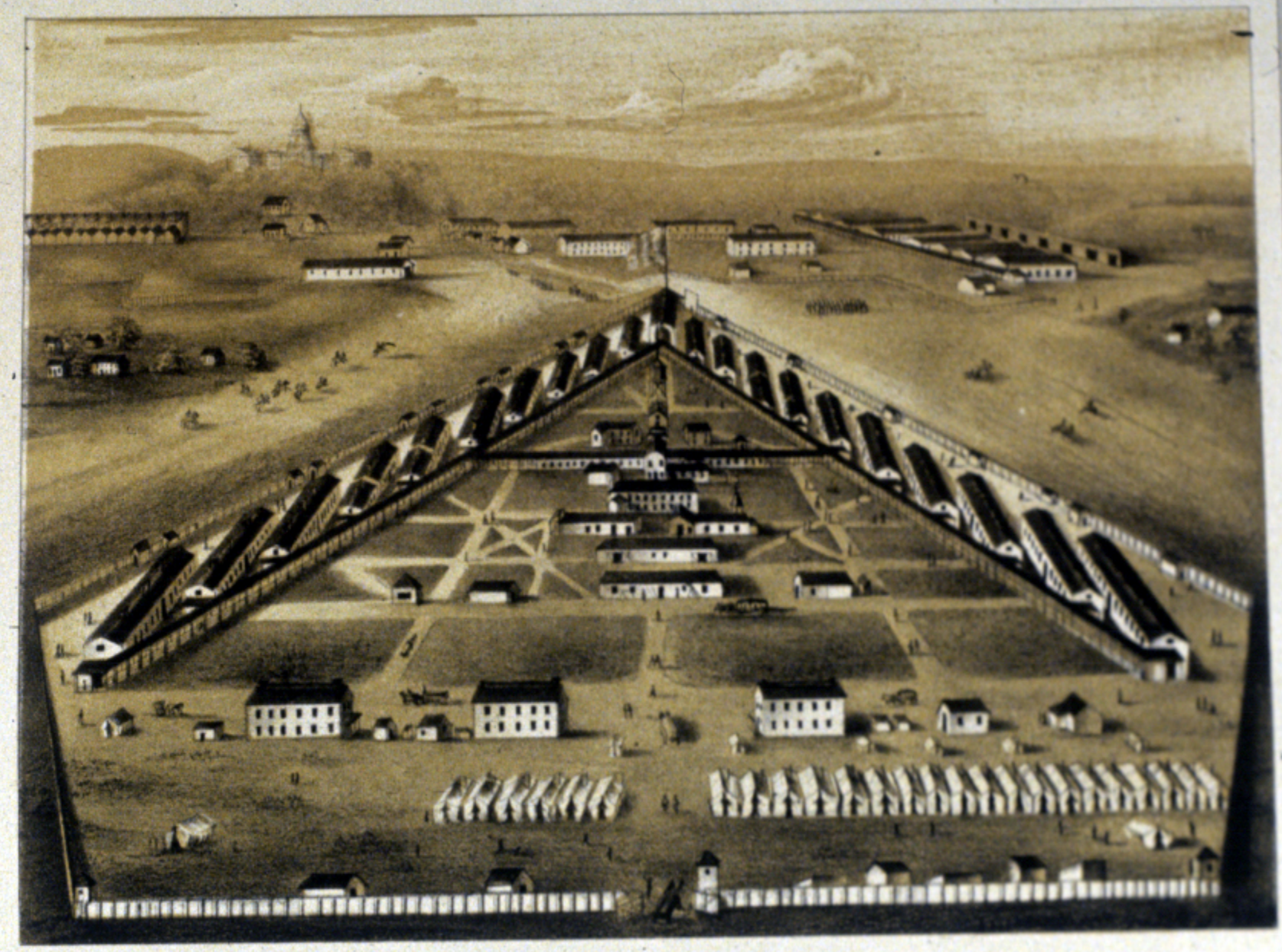
SURGEON GENERAL'S OFFICE,
WASHINGTON, D. C.,
October 20th, 1865.

BREVET MAJOR GENERAL JOSEPH K. BARNES,
SURGEON GENERAL U. S. ARMY.

GENERAL:—

IN response to your inquiries relative to the nature, extent, and value of the surgical data that have accumulated in the department of your office under my charge, and in regard to the progress that has been made in arranging these materials, I have the honor to make the following report:

The materials in the office relating to the surgery of the late war consist of the reports of the medical officers engaged in it, and of illustrations of these reports in the shape of pathological specimens, drawings, and models. The documentary data are of three kinds: first, the numerical returns, in which the number alone of the different forms of wounds, accidents, injuries, and surgical diseases is given; secondly, what may be called the nominal returns, in which are furnished the name and military description of each patient, and the particulars of the case, with more or less of detail; and thirdly, the miscellaneous reports. To the first class belong the "classified return of wounds and injuries" which every medical officer has been required to furnish immediately after every engagement, the "tabular statement of gunshot wounds," and the portion of the "monthly report of sick and wounded" referring to surgical diseases and accidents. The second class comprises the "quarterly reports of wounded" and the "quarterly reports of surgical operations" required of all general and post hospitals, the quarterly "sanitary reports" of regimental surgeons, the "nominal lists of wounded" forwarded by medical directors after every general engagement, and extracts from "case books." In the third class are included the reports of medical directors of armies



T. SINCLAIR'S LITH. PHILA.

BIRDS EYE VIEW OF

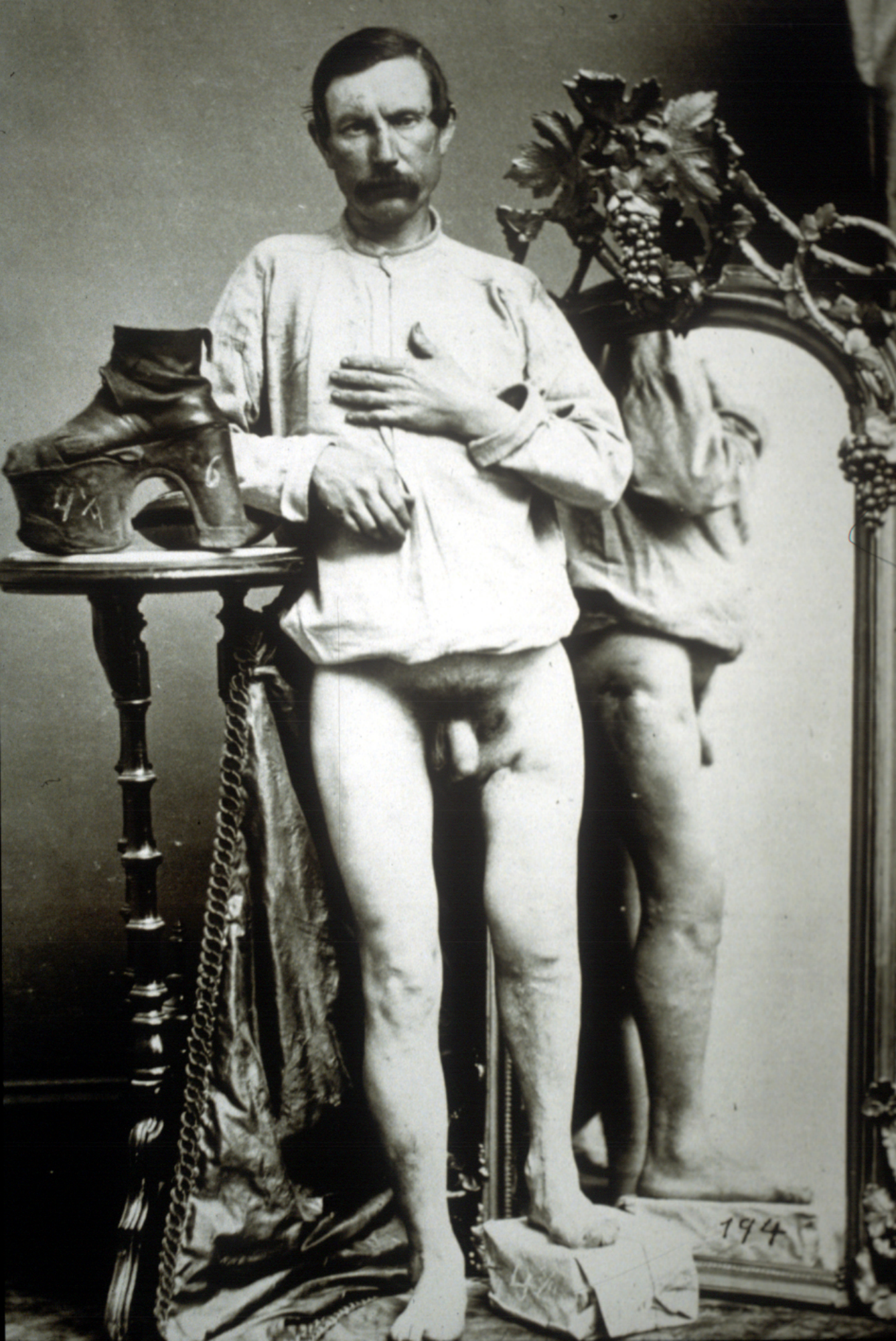
LINCOLN GENERAL HOSPITAL, WASHINGTON, D. C.

SEEN FROM THE REAR

16, 1864. Surgeon B. Gesner, 10th New York, reported: "Severe shot wound of left knee joint; amputation at lower third of femur. Sent to general hospital at City Point, Virginia, August 17th." He was admitted, on August 20th, into Satterlee Hospital, Philadelphia, from City Point. Surgeon I. I. Hayes, U. S. V., reported: "Gunshot wound of left leg by round ball, which embedded itself in knee joint; also conical ball, which was extracted high up on outer side of left thigh. August 17, 1864, circular amputation of lower third of left thigh. Improving slowly; simple dressings, tonics, and stimulants." On an unsigned case book of Ward 3, of Satterlee Hospital, the progress and treatment of the case are recorded as follows: "Stump looks well; patient somewhat weak but doing well. August 26th, suppurates very freely. August 28th, conical ball extracted from outer side of thigh two inches below great trochanter. Patient states that he saw one other ball extracted from the wound. September 1st, doing well; suffers from a bedsore contracted before he came here. States that he lost much blood during the amputation, which accounts for his weak and anæmic condition. September 9th, doing well. 21st, improving slowly. November 8th, transferred to Ward A." The progress of the case is continued on another case book, also unsigned: "December 2d, wound still discharging copiously. Bone exposed about one-eighth of an inch; general health middling, appetite good, bowels regular. Some difficulty with his urinary apparatus; detected pus in urine. January 9, 1865, morphia ceases to have any effect except to constipate. Remains much the same, better and worse, alternately, every ten or twelve days. February 4th, made an incision on external side of stump some two inches in length, just cutting the fascia, and removed a small piece of woolen. The muscles were not affected by the

FIG. 111.—Left femur, from a case of reamputation for osteomyelitis following shot injury. *Spec.* 5614, A. M. M.

FIG. 112.—Cicatrix twelve months after coxo-femoral disarticulation and reamputation. [From a photograph.]


194 F

2d Ohio Volunteers, aged 28 years, , November 27th, 1863, by a conoidal the inner canthus of the right eye, it through the outer wall of the left ld hospital for several days, and on spital at Alexandria, Virginia. His matose. On December 8th, Surgeon d removed a disk of bone from the ry ridges. Splinters of bone, consti- were removed at the same time. No ember 13th, 1863. The pathological ined for extensive fracture of frontal contributed by the operator.

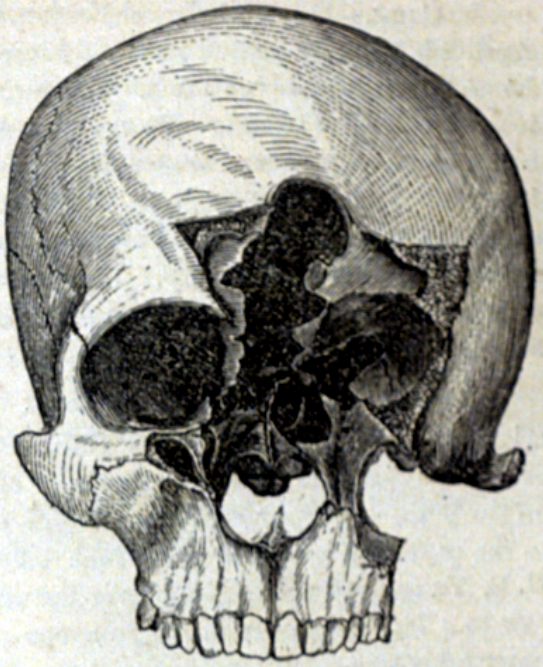


FIG. 130.—Section of a skull much shattered by gunshot, and trephined. *Spec.* 2690, Sect. I, A. M. M.

48th Pennsylvania Volunteers, aged sylvania Court-house, Virginia, May ed and depressed the left parietal bone linal sinus. He was admitted to the the Carver Hospital, Washington, on times manifesting slight symptoms of lligibly. On the evening of the 15th, wing morning the patient was placed Surgeon J. O. French trephined the ral large splinters of the external table. adrangular shape, measuring an inch y imbedded in the brain. The mem- were lacerated by the depressed frag- dullary substance and blood that had ble hæmorrhage occurred during the The operation relieved the patient quite animated, remaining so until the ned on the 20th. The autopsy revealed tion of purulent matter in the region of ended with blood, and a small piece of he pathological specimen is a disk and ium. The largest fragment is from the ter. The specimen and history were V.

FIG. 131.—Disk and fragments of skull removed by trephining. *Spec.* 2302, Sect. I, A. M. M. [Nat. size.]

D, 155th Pennsylvania Volunteers, was wounded at the battle of Fredericksburg, musket ball, which entered at the juncture of coronal and squamous sutures, and ice Hospital, Washington, D. C., on the 17th, complaining but very little of his 19th, when the pain became so severe that he was compelled to take to his bed. ns of febrile excitement. A lotion of lead water and laudanum was ordered to be istered. Up to this time he had not been delirious and was able to give rational the 20th, he was comatose and all the symptoms of compression of the brain were

Photographed by Dr. E. Curtis U.S.A. *on steel by H. Faber*

PERPENDICULAR SECTION OF COLON,
showing
an enlarged solitary gland which has recently ruptured.
Magnified 12 diameters.

Stauch del. T. Sinclair & Son. Chromolith.

PLATE IX. LACERATION OF THE BUTTOCKS BY A SHELL FRAGMENT.

A. P. E. Pg. Co., Phila.

Photo-Relief Print.

TRANSVERSE COLON WITH PSEUDO-MEMBRANOUS PATCHES.

No. 124. MEDICAL SECTION.

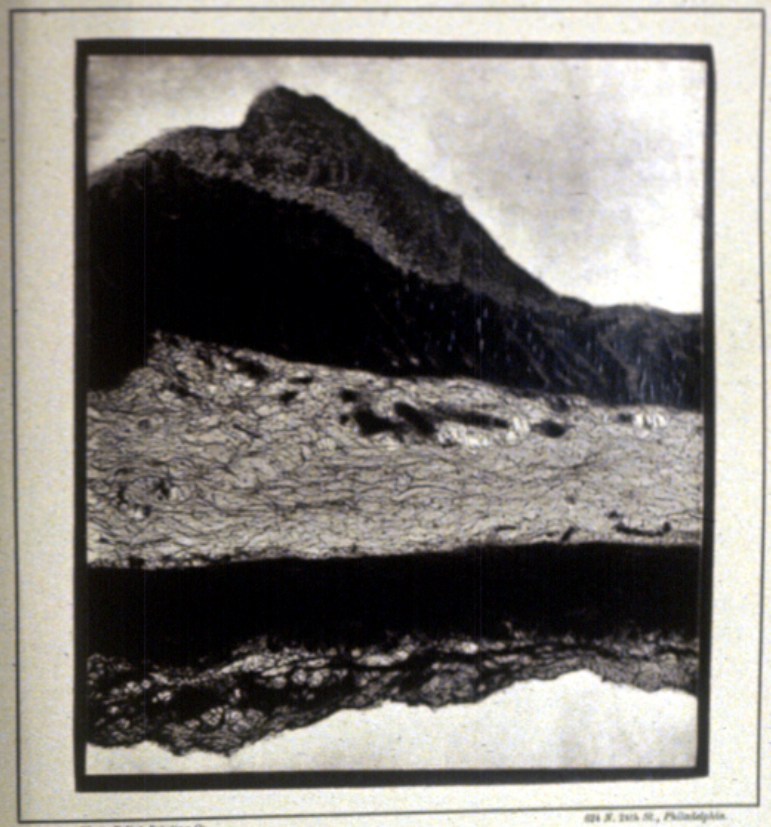
possible enough, and is supported by the occasional observation of columnar epithelial cells either detached or cohering in laminæ in the dysenteric stools. On the other hand, I am satisfied that in perpendicular sections I have several times positively recognized the epithelium in situ beneath the exudation, and I have no doubt that it is often entangled in the diphtheritic layer and shares the fate of the other tissues thus involved.*

The photo-plate facing this page is a reproduction by a mechanical process of a micro-photograph representing preparation No. 681, Microscopical Section, Army Medical Museum, which is a perpendicular cut of a portion of colon presenting the slighter degree of the diphtheritic process hitherto described. The cut is one of a series of five from the same intestine, [Nos. 678 to 682, Microscopical Section,] all of which present similar lesions. They are from a boiled preparation stained with yellow aniline and mounted in gum and glycerine. The intestine was obtained from the body of a soldier dead of dysentery in Washington during the year 1864. No further particulars were recorded at the time.

FIG. 8.—Diagram explanatory of the plate facing this page. A. Mucous coat; *a, a*, glands of Lieberkühn. B. Muscle of Brücke. C. Submucous connective tissue; *b, b*, blood-vessels cut across. D Circular; E. Longitudinal muscular coat. F. Subperitoneal connective tissue. G. Peritoneal epithelium. H. Diphtheritic layer, which is plainly seen to be continuous with the contents of the glands of Lieberkühn.

The portion of No. 681 exhibited in the plate is magnified 63 diameters by a Beck's ⅔ objective. The mucous surface of the piece is coated by a diphtheritic layer composed of a granular fibrinous mass entangling numerous lymphoid elements, (pus corpuscles,) which appear in the plate as black dots, and are most abundant in the left hand of the piece near the mucous surface, where they form an opaque mass. The glands of Lieberkühn are distended by the accumulation in their cavities of a substance similar to that composing the diphtheritic layer and continuous with it; as can be seen especially on the right of the plate. They are also pushed pre-

* The transformation of the epithelium in the diphtheritic processes affecting the soft palate and pharynx, the larynx and trachea, has been carefully studied by E. WAGNER—*Die Diphtheritis und der Croup des Rachens und der Luftwege in anatomischer Beziehung*, Archiv der Heilkunde, 1866, S. 481—according to whom the diphtheritic network described in the text as fibrinous, results from a transformation of the epithelial cells of the affected part. These at first swell up from imbibition of plasma; subsequently a network originates in each cell, the processes of which become continuous with those of the network formed in adjoining cells. This transformation he observed especially in the pavement epithelium of the pharynx and soft palate. E. RINDFLEISCH—*Lehrbuch der pathologischen Gewebelehre*, Leipsic, 1873, S. 314—while admitting that he has seen indications of this metamorphosis at the edges of the pseudomembrane in some cases, has expressed doubts as to how far it can be accepted as affording a general interpretation of the formation of the diphtheritic network. NASSILOFF—*Ueber die Diphtheritis*, Virchow's Archiv, Bd. L, 1870, S. 550—was never able to observe the process described by WAGNER, and points out that the network has the chemical reactions of fibrin, a fact which WAGNER himself seems half inclined to admit: "Die netzförmige Substanz der diphtheritischen und der croupösen Auflagerung unterscheiden sich in chemischer Beziehung nicht wesentlich von einander. Sie stehen unter den bekannten chemischen Stoffen dem geronnenen Faserstoff am nächsten," S. 488, *op. cit., supra*. M. BOLDYREW—*Ein Beitrag zur Histologie des croupösen Processes*, Reichert und Du Bois-Reymond's Archiv für Anat., Physiol., &c., 1872, S. 75, also Taf. II—has critically examined the diphtheritic process in the larynx and trachea to ascertain whether WAGNER's view is correct, and arrived at the conclusion that it is not, and that the network is simply fibrinous. He also states that in this situation the ciliated epithelium is thrown off during the catarrhal stage which precedes the formation of the false membrane. F. STRUDENER—*Zur Histologie des Croup im Larynx und der Trachea*, Virchow's Archiv, Bd. LIV, 1872, S. 500—from a similar investigation arrived at like results. In this connection I may refer, in corroboration of the statement in the text, that "I have several times positively recognized the epithelium in situ beneath the exudation," to Taf. IV, Fig. 13, illustrative of the paper of OERTEL—*Experimentelle Untersuchungen über Diphtheria*, Deutsches Archiv für klinische Medicin, Bd. VIII, 1871, S. 242—which represents a perpendicular section of the diphtheritic mucous membrane of the trachea of a rabbit. In this figure the fibrinous diphtheritic layer reposes on the surface of the cylindrical epithelium, which is infiltrated, as well as the subepithelial tissue, with lymphoid elements. The diphtheritic layer is also infiltrated with micrococci and large cells. The latter I do not recognize; with this exception the picture is not unlike what I have many times seen in sections of the intestine.



Am. Photo-Relief Printing Co., 624 S. 24th St., Philadelphia.

PERPENDICULAR SECTION OF COLON

COATED WITH PSEUDOMEMBRANE. MAGNIFIED 63 DIAMETERS.

PHOTO-MICROGRAPH BY ASSISTANT SURGEON J. J. WOODWARD, U. S. A.

From No. 681. MICROSCOPICAL SECTION.

Wm. Bell phot.

T. Sinclair & Son

PLATE XXXVIII.— FACIAL PARALYSIS CONSEQUENT ON SHOT INJURY.

THE

MEDICAL AND SURGICAL HISTORY

OF THE

WAR OF THE REBELLION.

(1861-65.)

PREPARED, IN ACCORDANCE WITH ACTS OF CONGRESS, UNDER THE DIRECTION OF

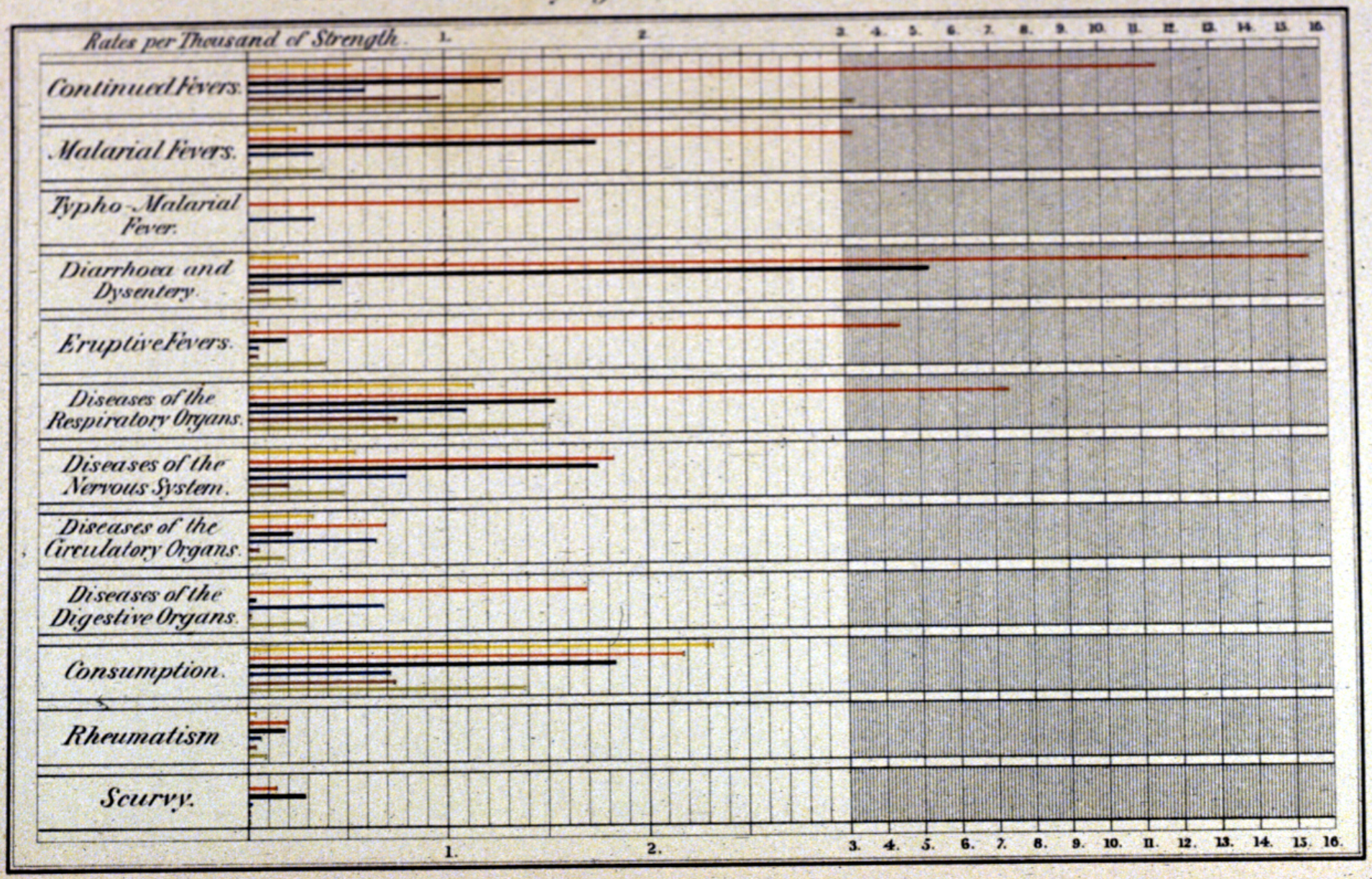
Surgeon General JOSEPH K. BARNES, United States Army.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1870.

Another case of alleged fracture by contre-coup of both orbital plates of the frontal by the transmitted shock from the perforation of the occipital by a pistol ball, has been much commented on:

CASE.—A. L——, aged 56 years, was shot in the head, at Washington, on the evening of April 14th, 1865, by a large round ball, from a Derringer pistol, in the hands of an assassin. Dr. Charles A. Leale being close at hand, went instantly to the wounded man, whom he found "in a profoundly comatose condition." * * the breathing "exceedingly stertorous." (These and other quotations in the first part of this abstract, are taken from a report compiled by Dr. Leale, from notes made at the time.) No pulsation was perceptible at the right wrist. When the head was examined, "I passed my fingers over a large firm clot of blood, situated about one inch below the superior curved line of the occipital bone and an inch and a half to the left of the median line of the same bone. The coagulum, I easily removed, and passed the little finger of my left hand through the perfectly smooth opening made by the ball, and found that it had entered the encephalon. As soon as I removed my finger, a slight oozing of blood followed, and his breathing became more regular and less stertorous." After the administration of a small quantity of brandy and water, of which a mouthful appeared to have passed into the stomach, the patient was removed to a neighboring house, with the assistance of Acting Assistant Surgeons C. S. Taft and A. F. A. King, and others. His clothing was removed, and he was placed in bed. His extremities were cold. He was covered with warmed blankets, and bottles of hot water were applied to the lower extremities. It was now about eleven o'clock at night, the wound having been inflicted about half past ten. His family physician, Dr. Robert H. Stone, and Surgeon General Barnes, and Assistant Surgeon General Crane, arrived presently, and assuming charge of the case, proceeded to examine the patient and the wound. The pulse was very feeble and vaccillating, from 40 to 48; the respiration was oppressed and labored; the surface was cold Over the left eye-lid there was slight ecchymosis. "The pupil of that eye was slightly dilated, the left pupil was contracted;" both were irresponsive to light. Sinapisms were applied to the surface. A few drops of brandy and water placed into the fauces was not swallowed, and the attempt to administer internal stimulants was not insisted on. It was observed that when blood and cerebral matter oozed unimpededly from the wound the condition of the pulse and respiration improved. The Surgeon General accordingly kept the external wound open by means of a silver probe, until, a Nélaton's probe being brought, he made an exploration of the course of the ball. A splinter obstructed the track at the depth of about two and a half inches. An inch and a half further on the bulb came in contact with a foreign body, which proved to be the disk from the occipital forced out by the ball; passing beyond this the ball was detected, at a distance of over six inches from the entrance wound. Drs. Stone and Crane having also distinctly felt the ball at this depth in contact with the bulb of the probe, it was decided that no attempt should be made to remove it or the foreign bodies, further than "to keep the opening free from coagula, which, when allowed to form and remain for a very short time, would produce signs of increased compression, the breathing becoming profoundly stertorous and intermittent, and the pulse more feeble and irregular." Notwithstanding the free oozing from the external orifice, there was evidently much internal bleeding going on, as was indicated by the excessive extravasation into the orbits, accompanied by great ecchymosis of the eyelids. The protracted death-struggle ceased at twenty minutes past seven o'clock on the morning of April 15th, 1865. At noon, an autopsy was made in the presence of the Surgeon General and others, by Assistant Surgeon J. J. Woodward, U. S. A., aided by Assistant Surgeon Edward Curtis, U. S. A. The following is an extract from the official report to the

A Comparison of the Annual Mortality Rates caused by certain Specified Diseases in Various Bodies of Men of the Military Age.



MAP
of
FREDERICKSBURG Va & VICINITY

NOTE

- Corps General Hospitals
- Corps Field Hospitals at the Battle of Fredericksburg
- Corps Field Hospitals at the Battle of Chancellorsville

Location of Hospitals furnished by Surg. J. Letterman U.S.A.

Scale of miles

396-050
army-Med

THE MEDICAL AND SURGICAL HISTORY

OF THE

WAR OF THE REBELLION.

PART II.

VOLUME II.

SURGICAL HISTORY.

Prepared, under the direction of JOSEPH K. BARNES, Surgeon General United States Army.

By GEORGE A. OTIS, Assistant Surgeon United States Army.

SECOND ISSUE.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1877.

Diagram showing the monthly ratio of the cases of Diarrhoea and Dysentery among White troops.

Atlantic Region. — Central Region. — Pacific Region.

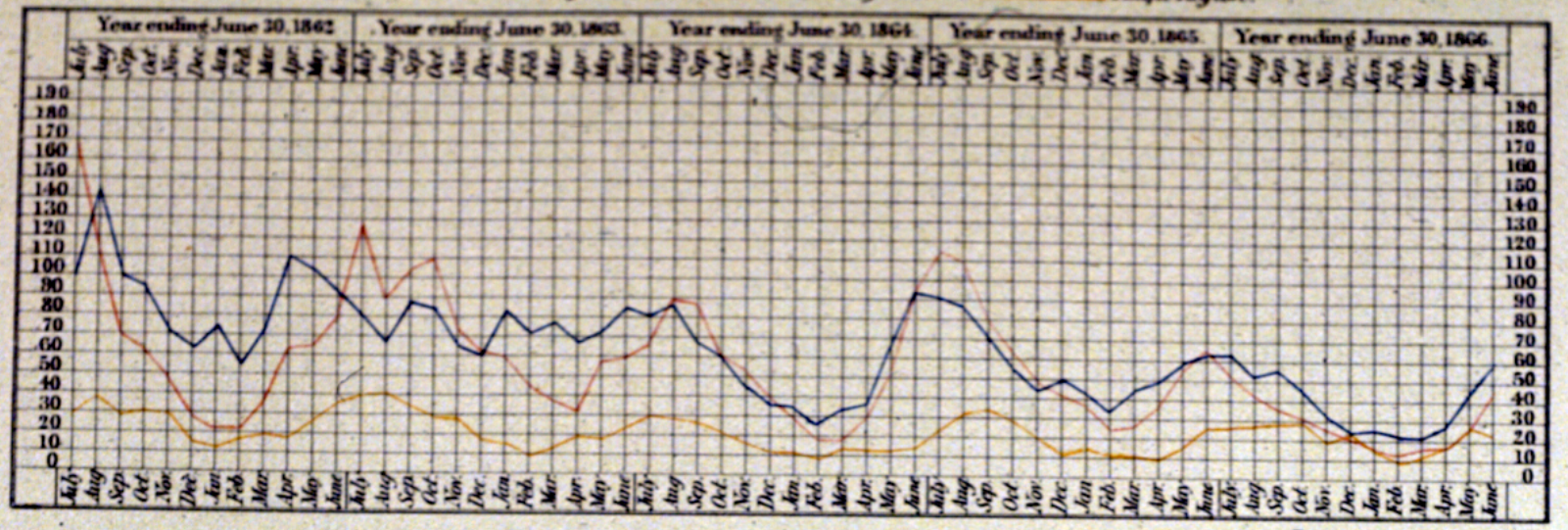
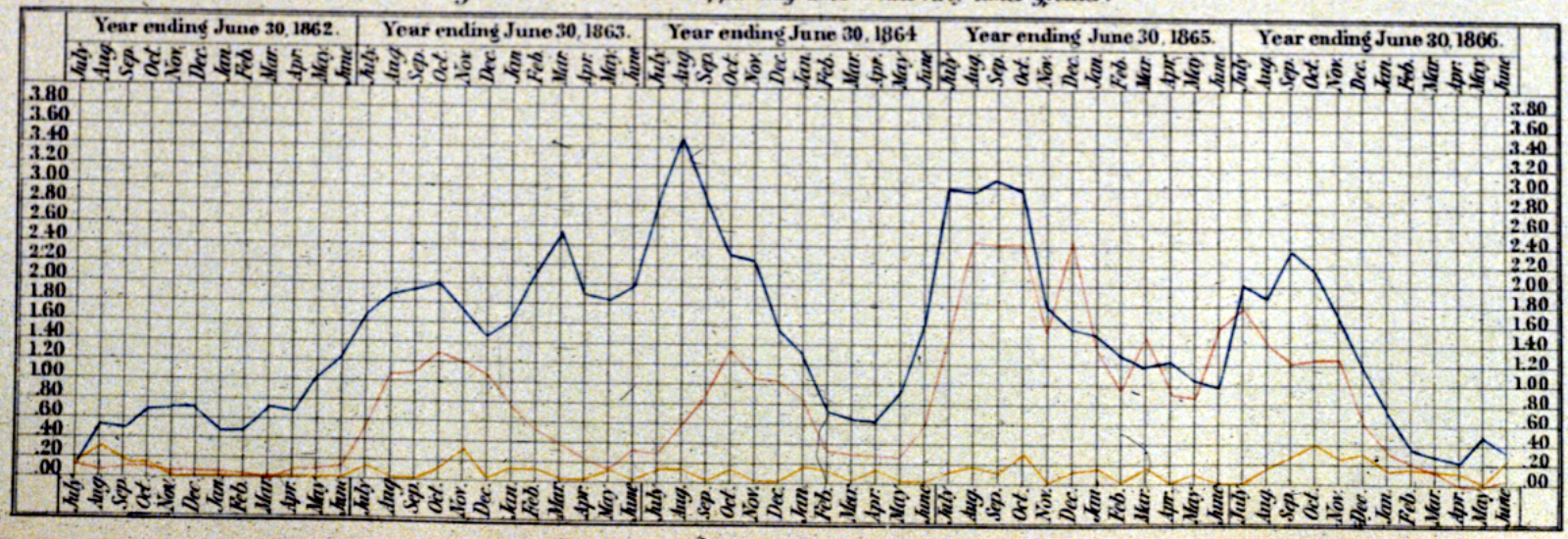

Year ending June 30, 1862.
Year ending June 30, 1863.
Year ending June 30, 1864.
Year ending June 30, 1865.
Year ending June 30, 1866.
July Aug. Sep. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0

Diagram showing the monthly ratio of the deaths of Diarrhoea and Dysentery among White troops.

Regions as indicated in the upper diagram. Scale fifty times greater.


Year ending June 30, 1862.
Year ending June 30, 1863.
Year ending June 30, 1864.
Year ending June 30, 1865.
Year ending June 30, 1866.
July Aug. Sep. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June
3.80 3.60 3.40 3.20 3.00 2.80 2.60 2.40 2.20 2.00 1.80 1.60 1.40 1.20 1.00 .80 .60 .40 .20 .00